

# ***CURRICULUM VITA***

## ***MICHEL W. BARSOUM***

### **PERSONAL**

Date of Birth: January 1, 1955  
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### **EDUCATION**

Ph.D. MASSACHUSETTS INSTITUTE OF TECHNOLOGY, June 1985  
Degree in Ceramics from Department of Materials Science and Engineering

M.Sc. UNIVERSITY OF MISSOURI-ROLLA, ROLLA, MO. June 1980  
Degree in Ceramics Engineering, Department of Ceramic Engineering

B.Sc. AMERICAN UNIVERSITY IN CAIRO, CAIRO, EGYPT Feb. 1977  
Department of Materials Engineering; Highest honors.

### **PROFESSIONAL EXPERIENCE**

DREXEL UNIVERSITY, Philadelphia, PA. Sept. 1999-present  
Distinguished Professor, Department of Materials Science and Engineering

LINKOPING UNIVERSITY, Linkoping, Sweden Oct. 08-present  
Visiting Professor

INSTITUT POLYTECHNIQUE DE GRENOBLE, Grenoble, France Jan. –Mar. 2016  
Sabbatical leave.

IMPERIAL COLLEGE, London, UK Sept.–Dec. 2015  
Sabbatical leave as Leverhulme Trust scholar.

NINGBO INSTIT. OF MATERIALS TECHNOLOGY, Ningbo, China Sept. 2013-2014  
Visiting Professor

DREXEL UNIVERSITY, Philadelphia, PA. Jan. 2009-2013  
A. W. Grosvenor Professor, Department of Materials Science and Engineering

LOS ALAMOS NATIONAL LABORATORY, Los Alamos, NM Oct. 08 – Sept. 09  
Wheatly Scholar, Sabbatical Leave

COMMISSARIAT A L'ENERGIE ATOMIQUE, CEA, Saclay, France, Summer 2006

UNIVERSITY OF POITIERS, Poitiers, France, Summer 2003  
Visiting Professor

MAX-PLANCK INSTITUTE, PML, Stuttgart, Germany Sept. 2000-2001  
Sabbatical Leave

DREXEL UNIVERSITY, Philadelphia, PA. Sept. 1997-1999  
Professor, Department of Materials Engineering

MAX-PLANCK INSTITUTE, FKF, Stuttgart, Germany Sept. 1993-94  
Sabbatical Leave

DREXEL UNIVERSITY, Philadelphia, PA. Sept. 1985-99  
Assistant and Associate Professor, Department of Materials Engineering

## **AWARDS** (Highlighted entries are noteworthy)

Foreign Member of the Royal Swedish Academy of Engineering Sciences, 2016.  
Chair of Excellence, Nanosciences Foundation, Univ. Foundation Grenoble Alpes, France, 2016, [www.fondation-nanosciences.fr/#](http://www.fondation-nanosciences.fr/#)  
Elsevier Scopus, List of 300 most Cited Authors in Materials Science and Engineering, 2016. [www.msesciences.com/blogs/news/2016-the-most-cited-researchers-in-materials-science-and-engineering-by-elsevier-scopus-data](http://www.msesciences.com/blogs/news/2016-the-most-cited-researchers-in-materials-science-and-engineering-by-elsevier-scopus-data)  
ASM Delaware Valley Materials Person of the Year, 2016.  
Visiting Professor, Grenoble Institut. of Tech. Grenoble, France; Winter, 2016.  
Leverhulme Trust Visiting Professorship, Imperial College, London, UK; Fall 2015.  
Outstanding Research Award, Dept. of Materials Science and Engin., Drexel Univ., 2013.  
Visiting Professor, Ningbo Institut. Mater. Techn. & Engin., Chinese Acad. of Sciences; 2013-2014  
Ross Coffin Purdy Award 2013, American Ceramic Society.  
Visiting Professor, University of Poitiers, Poitiers, France; Feb. 2012.  
ISI's Most Highly Cited Authors List 2009 (<http://isihighlycited.com/>).  
Visiting Professor, Linköping University, Linköping, Sweden.  
A. W. Grosvenor Professor, Department of Materials Science and Engineering, 2009-2014.  
Wheatly Scholar, Los Alamos National Laboratory, Los Alamos, NM, October 2008.  
2008 Sigma Xi Lecture, MIT, Cambridge, MA, May 2008.  
Outstanding Research Award, Department of Materials Science and Engineering, 2008.  
University Research/Scholarship Award, Drexel University, 2007 (Inaugural award).  
Academician, World Academy of Ceramics, 2006.  
Fellow, American Ceramic Society, 2005.  
Marquis Who's Who in Science and Engineering, 2005-2006 Edition.  
Outstanding Service Award, Department of Materials Science and Engineering, 2006.  
Outstanding Teaching Award, Department of Materials Science and Engineering, 2005.  
Outstanding Research Award, Department of Materials Science and Engineering, 2003.  
Visiting Professorship, U. of Poitiers, Poitiers, France, 2003.  
Outstanding Research Award, College of Engineering, Drexel University, 2003.  
Research Scholar Award, Drexel University, 2001.  
Alexander von Humboldt-Max Planck Society Prize for Senior US Scientists, 2000.  
Distinguished Professor, Drexel University, 1999.

## **EDITORSHIPS AND EDITORIAL BOARD MEMEBERSHIPS**

Editor: *Materials Research Letters*, Taylor and Francis.  
Member of Editorial Boards: *Results in Physics*, *Ceramics International* and *FlatChem*.

## **BOOKS**

M. W. Barsoum, *MAX Phases: Properties of Machinable Carbides and Nitrides*, Wiley VCH GmbH & Co. 2013.  
M. W. Barsoum, *Fundamentals of Ceramics*, Taylor and Francis, London, 2003.  
M. W. Barsoum, *Fundamentals of Ceramics*, McGraw Hill, NY, 1997.

## **PATENTS:**

- 1) M. W. Barsoum, "Methods for Densifying and Strengthening Ceramic-Ceramic Composites by Transient Plastic Phase Processing". Patent # 5,451,365 (1997).
- 2) M. W. Barsoum, D. Brodtkin, T. El-Raghy and G. S. Yaroschuk, "Synthesis of H-phase Products", WO 9727965, Issued in 1997.

- 3) M. W. Barsoum and T. El-Raghy, "Process for Making a Dense Ceramic Work-piece." Patent # 5,882,561. Issued in 1999.
- 4) M. W. Barsoum, T. El-Raghy, D. Brodtkin, A. Zavaliangos and S. Kalidindi, "Synthesis of 312 Compounds and Composites Thereof, Patent # 5,942,455. Issued in 1999.
- 5) M. W. Barsoum and T. El-Raghy, "Surface Modification of 312 and Related Materials", US Patent # 6,013,322. Issued in 2000.
- 6) R. Knight and M. W. Barsoum, "Corrosion, Oxidation, and/or Wear-Resistant Coatings", U.S. Patent No. 6,231,969. Issued May 2001.
- 7) T. El-Raghy, M. W. Barsoum, M. Sundberg and H. Pettersson, "Process for Forming 312 Phase Materials and Process for Sintering the Same", US Patent # 6,461,989. Issued October 2002.
- 8) M. Sundberg, K. Lindgren, T. El-Raghy and M. W. Barsoum, "Method of Producing a Metal-containing Single-phase Composition", US Patent # 6,986,873. January 2006.
- 9) V. Jovic and M. W. Barsoum, "Electrolytic Cell and Electrodes For Use in Electro-chemical Processes", US Patent 7,001,494. Issued Feb. 2006.
- 10) S. Gupta, M. W. Barsoum, C.-W. Li and T. G. Palanisamy, "Ternary Carbide and Nitride Materials Having Tribological Applications and Methods of Making Same". US Patent 7,553,564 B2. Issued June 2009.
- 11) T. G. Palanisamy, S. Gupta, M. W. Barsoum and C.-W. Li, "Ternary Carbide and Nitride Composites having Tribological Applications and Methods of Making Same". US Patent 7,572,313 B2. Issued August 2009.
- 12) S. Basu, P. Finkel, A. Zhou and M. W. Barsoum, "A Method for Structural Health Monitoring Using a Smart Sensor System". US Patent 7,917,311.
- 13) Y. Gogotsi and M. W. Barsoum, "Nanoporous Carbide Derived Carbon with Tunable Pore Size". Japanese Patent No. 4,646,911; US Patent 8,137,650, issued 3/20/2012.
- 14) M. W. Barsoum, Y. Gogotsi, M. Naguib and O. Mashtalair, "Compositions Comprising Free Standing Two Dimensional Nanocrystals", US Patent 9,193,595 issued 11/24/2015.
- 15) M. W. Barsoum, Y. Gogotsi, M. Naguib and O. Mashtalair, "Compositions Comprising Free Standing Two Dimensional Nanocrystals", US Patent 9,416,011 B2 issued 8/16/2016.

### **PENDING/Abandoned**

- 16) M. W. Barsoum, M. Ghidui & Y. Gogotsi, A. Fafarman, A. Dillon, "Physical Forms of MXene Materials Exhibiting Novel Electrical Characteristics", Nonprovisional patent filed.
- 17) M. W. Barsoum and C. Hu, "Nanolaminated 2-2-1 Max-Phase Compositions", Nonprovisional patent filed.
- 18) M. W. Barsoum and C. Li, "Improved Route to MXene Carbides", PCT filed on Aug. 17, 2016.
- 19) S. Amini and M. W. Barsoum, "MAX-Based Metal Matrix Composites". Non-provisional patent filed. 12/477,825.
- 20) M. W. Barsoum, E. N. Hoffman and R. D. Doherty, "Reduction of Spontaneous Metal Whisker Formation". Abandoned.
- 21) Y. Gogotsi, G. Yushin, E.N. Hoffman, M. W. Barsoum, "Nanoporous Carbonaceous Membranes and Related Methods", PCT/US2007/011442.
- 22) Y. Gogotsi, G. Yushin, E. N. Hoffman & M.W. Barsoum, "Process for Producing Nanoporous CDCs with Large Specific Surface Area", PCT/US2006/045154.
- 23) A. Moseson, S. Basu and M. W. Barsoum, "A Novel Method for Zero Point Detection".
- 24) S. Amini and M. W. Barsoum, "MAX-Based Metal Matrix Composites". Non-provisional patent filed. 12/477,825.

### **BOOK CHAPTERS, INVITED AND REVIEW ARTICLES** (Highlighted papers are noteworthy)

1. M. Naguib, V. Mochalin, M. W. Barsoum and Y. Gogotsi, "MXenes: A New Family of Two Dimensional Materials", *Advanced Materials*, **26**, 992 (2014). (Invited: 25 yr Anniversary Issue)

2. M. Radovic and M. W. Barsoum, "The MAX Phases: Bridging the Gap Between Metals and Ceramics", *Amer. Cer. Soc. Bull.*, **92**, 20-27, April 2013.
3. S. Gupta and M. W. Barsoum, "On the Tribology of the MAX Phases and Their Composites – A Review", *Wear*, **271**, 1878-1894 (2011).
4. M. W. Barsoum and M. Radovic, "The Elastic and Mechanical Properties of the MAX Phases", *Annual Review of Materials Research*, Eds. D. Clarke and M. Ruhle, Vol. **41**, 9.1-9.33 (2011).
5. M. W. Barsoum and S. Basu, "Kinking Nonlinear Elastic Solids", *Encyclopedia of Materials Science and Technology*, Eds. K. H. J. Buschow, R. W. Cahn, M. C. Flemings, B. Ilshner, E. J. Kramer, S. Mahajan, and P. Veysiere, Elsevier, Oxford, 2010, Pages 1-23.
6. M. W. Barsoum, "The MAX Phases and Their Properties", *Ceramics Science and Technology, Vol. 2: Properties*, Eds. R. Riedel & I.-W. Chen, Wiley-VCH Verlag GmbH & Co., pp. 299-345 (2010).
7. M. W. Barsoum, "Nanolayered Kinking Nonlinear Elastic Solids", *Handbook of Nanomaterials*, Ed. Y. Gogotsi, CRC Press, 2006.
8. M. W. Barsoum "Physical Properties of the MAX Phases", *Encyclopedia of Materials Science & Technology*, Eds. K. H. J. Buschow, R. W. Cahn, M. C. Flemings, E. J. Kramer, S. Mahajan and P. Veysiere, Elsevier Science, Amsterdam, 2006.
9. M. W. Barsoum and M. Radovic, "Mechanical Properties of the MAX Phases", *Encyclopedia of Materials Science & Technology*, Eds. K. H. J. Buschow, R. W. Cahn, M. C. Flemings, E. J. Kramer, S. Mahajan and P. Veysiere, Elsevier Science, Amsterdam, 2004.
10. M. W. Barsoum and T. El-Raghy, "The MAX Phases: Unique New Carbide and Nitride Materials", *American Scientist*, **89**, 336-345 (2001).
11. M. W. Barsoum, "The  $M_{n+1}AX_n$  Phases: A New Class of Solids: Thermodynamically Stable Nanolaminates", *Prog. Solid State Chem.*, **28**, 201-281 (2000). **This paper has been cited > 1200 times.**
12. M. W. Barsoum, T. El-Raghy and M. Radovic, " $Ti_3SiC_2$ : A Layered Machinable Ductile Ceramic", *Interceram*, **49**, 226-233 (2000).
13. M. W. Barsoum, A. Zavaliangos, S. Kalidindi, T. El-Raghy and D. Brodtkin, "Transient Plastic Phase Processing of Ceramic-Ceramic Composites", *JOM*, November 1995, p. 52.
14. M. W. Barsoum, "Degradation of Ceramics in Alkali Metal Environments", *Science and Technology of Fast Ion Conductors*, Eds. H. Tuller and M. Balkanski, NATO Advanced Study Institute Series. pp. 241-270 (1989).

## **REFEREED JOURNAL PAPERS:**

**According to ISI: h index: 66; Total citations > 17,500. (Highlighted papers are noteworthy)**

**2017**

365. T. Ouisse and M. W. Barsoum, "Electron Transport in the MAX Phases and their 2D MXene Counterparts", Sub. for pub.
364. D. Freiberg, M. W. Barsoum and G. Tucker, "On the Nucleation of Bulk Ripplacations in Graphite", Sub. for pub.
363. M. Nelson, B. Anasori, J. Yang and M. W. Barsoum, "Synthesis and Characterization of the Mechanical Properties of  $Ti_3SiC_2/Mg$  and  $Cr_2AlC/Mg$  Alloy Composites", Sub. for pub.

362. G. Ying, A. D. Dillon, A. T. Fafarman and M. W. Barsoum, "Transparent, Conductive Solution Processed Spincast 2D  $Ti_2CT_x$  (MXene) Films", *Mater. Res. Lett.* Accepted.
361. O. Rivin, E. N. Caspi, A. Pesach, H. Shaked, A. Hoser, R. Georgii, Q. Tao, J. Rosen and M. W. Barsoum, "Evidence for Ferromagnetic Ordering in the MAX Phase  $(Cr_{0.95}, Mn_{0.05})_2GeC$ ", Sub. for pub.
360. M. R. Lukatskaya, S. Kota, Z. Lin, M.-Q. Zhao, N. Shpigel, M. D. Levi, J. Halim<sup>1,2</sup>, P.-L. Taberna, M. W. Barsoum, P. Simon and Y. Gogotsi, "Ultrahigh Rate Pseudocapacitive Energy Storage in Two-dimensional Transition Metal Carbides", Sub. for pub.
359. J. Griggs, A. C. Lang, J. Gruber, G. Tucker, M. L. Taheri and M. W. Barsoum, Spherical Nano-indentation, Modelling and Transmission Electron Microscopy Evidence for Ripplifications in  $Ti_3SiC_2$ ", Sub. for pub.
358. S. Kota, M. Agne, E. Zapata-Solvas, D. Lopez, M. Radovic, O. Dezellus and M. W. Barsoum, "Thermodynamic Parameters and Thermal Stability of MoAlB", Sub. for pub.
357. M. Ghidui, S. Kota, J. Halim, A. W. Sherwood, N. Nedfors, J. Rosen, V. N. Mochalin and M. W. Barsoum, "Alkylammonium Cation Intercalation into  $Ti_3C_2$  (MXene) - Effects on Properties and Layer-Charge Estimation," *Chem. Mater.* In print. (2017).
356. J. Halim, P. Chartier, T. Basyuk, T. Prikhna, El'ad N. Caspi, M. W. Barsoum and T. Cabioc'h, "Structure and Thermal Expansion of  $(Cr_x, V_{1-x})_{n+1}AlC_n$  Phases Measured by X-ray Diffraction," *J. Europ. Ceram. Soc.* **37**, 15–21 (2017).
355. F. M. Römer, U. Wiedwald, T. Strusch, J. Halim, E. Mayerberger, M. W. Barsoum and Michael Farle, "Controlling the Conductivity of  $Ti_3C_2$  (MXene) by Inductive Low Pressure Oxygen and Hydrogen Plasma Treatment and Humidity" *RSC Advances*, accepted.
354. J. Griggs, B. Anasori, G. Vetterick, G. Bentzel, M. Taheri and M. W. Barsoum, "On the Origin of Spontaneous Reversible Hysteresis in Magnesium Single Crystals Explored by Spherical Nanoindentation", Sub. for pub.
353. A. Miranda, J. Halim, A. Lorke and M. W. Barsoum, "Rendering  $Ti_3C_2T_x$  (MXene) Monolayers Visible", *Mater. Res. Lett.* In print. (2017).
352. P. Persson, L.-Å. Näslund, J. Halim, M. W. Barsoum, V. Darakchieva, J. Palisaitis, J. Rosen, P. O. Å. Persson, "On The Organization and Thermal Behavior of Surface Functional Groups on  $Ti_3C_2$  MXene in Vacuum", Sub. for pub.
351. O. Chaix-Pluchery, A. Thore, S. Kota, J. Halim, C. Hu, J. Rosen, T. Ouisse, M. W. Barsoum, "First-order Raman Scattering in Three Layered Mo-based Ternaries: MoAlB,  $Mo_2Ga_2C$  and  $Mo_2GaC$ ", *J. Raman Spect.* In print. (2017)
350. J. Lu, S. Kota, M. W. Barsoum and L. Hultman, "Atomic Structure and Lattice Defects in Nanolaminated Ternary Transition Metal Borides", *Mater. Res. Lett.* In print.
349. Q. Tao, M. Dahlqvist, J. Lu, S. Kota, R. Meshkian, J. Halim, J. Palisaitis, L. Hultman, M. W. Barsoum, P. O. Å. Persson and J. Rosen, "Two-dimensional  $Mo_{4/3}C$  (MXene) with Ordered Divacancies Derived from an In-plane Chemically Ordered  $(Mo_{2/3}, Sc_{1/3})_2AlC$  MAX Phase," *Nature Comm.* Accepted (2017).
348. L. Shannahan, M. W. Barsoum and L. Lamberson, "Dynamic Fracture Behavior of MAX Phase  $Ti_3SiC_2$ ", *Engin. Fract. Mech.*, **169**, 54–66 (2017).
347. D. Tallman, L. He, J. Gan, E. Caspi and M. W. Barsoum, "Effects of Neutron Irradiation of  $Ti_3SiC_2$  and  $Ti_3AlC_2$  in the 121–1085 °C Temperature Range", *J. Nucl. Mater.*, **484**, 120–134 (2017).

346. M-Q. Zhao, M. Torelli, C. E. Ren, M. Ghidui, Z. Ling, B. Anasori, M. W. Barsoum, and Y. Gogotsi, "2D Titanium Carbide and Transition Metal Oxides Hybrid Electrodes for Li-ion Storage. *Nano Energy* **30**, 603–13 (2016).
345. G. W. Bentzel, M. Ghidui and M. W. Barsoum, "On the Interactions of  $Ti_2AlC$ ,  $Ti_3AlC_2$ ,  $Ti_3SiC_2$  and  $Cr_2AlC$  with Pure Sodium at 550 °C and 750 °C", *Corr. Sci.* **111** 568–573 (2016).
344. C. Li, S. Kota, C. Hu and M. W. Barsoum, "On the Synthesis of Low Cost, Ti-based MXenes", *J. Ceram. Sci. Tech.*, **7**, 301-306 (2016).
343. A.-Y. Byeon, M.-Q. Zhao, C. E. Ren, J. Halim, S. Kota, P. Urbankowski, B. Anasori, M. W. Barsoum and Y. Gogotsi, "Two-dimensional Titanium Carbide MXene as a Cathode Material for Hybrid Magnesium/Lithium-ion Batteries", *ACS Appl. Mater. & Interfaces*, in print.
342. M. Ghidui, J. Halim, S. Kota, D. Bish, Y. Gogotsi and M. W. Barsoum, "Ion-Exchange and Cation Solvation Reactions in  $Ti_3C_2$  'MXene'", *Chem. Mater.*, **28**, 3507–3514 (2016).
341. O. Mashtalir, M. R. Lukatskaya, A. I. Kolesnikov, E. Raymundo-Piñero, M. Naguib, M. W. Barsoum and Y. Gogotsi, "The Effect of Hydrazine Intercalation on the Structure and Capacitance of 2D Titanium Carbide (MXene)", *Nanoscale*, **8**, 9128-9133 (2016).
340. Z. Huang, S. Wang, S. Kota, Q. Pan, M. W. Barsoum and C. Y. Li, "Structure and Crystallization Behavior of Poly(ethylene oxide)/ $Ti_3C_2T_x$  MXene Nanocomposites", *Polymer*, **102**, 119-126 (2016).
339. C. Zhang, S. J. Kim, M. Ghidui, M.-Q. Zhao, M. W. Barsoum, V. Nicolosi and Yury Gogotsi, "Layered Orthorhombic  $Nb_2O_5/Carbon@Nb_4C_3T_x$  and  $TiO_2/Carbon@Ti_3C_2T_x$  Hierarchical Composites for High Performance Li-ion Batteries", *Adv. Funct. Mater.*, **26**, 4143–4151 (2016).
338. G. Bentzel, M. Naguib, N. J. Lane, S. Vogel, V. Presser, S. Dubois, J. Lu, M.W. Barsoum and E. Caspi, "High-Temperature Neutron Diffraction, Raman Spectroscopy and First-principles Calculations on  $Ti_3SnC_2$ ", *J. Amer. Ceram. Soc.*, **99**, 2233-2242 (2106).
337. B. Anasori, C. Shi, E. J. Moon, Y. Xie, C. A. Voigt, E. Dooryhee, P. R. C. Kent, S. J. May, S. J. L. Billinge, M. W. Barsoum and Y. Gogotsi, "Control of Electronic Properties of 2D Carbides (MXenes) by Manipulating Their Transition Metal Layers," *Nanoscale Horizon*, **1**, 163–236 (2016).
336. T. Lapauw, K. Lambrinou, T. Cabioch, J. Halim, J. Lu, A. Pesach, O. Rivin, O. Ozeri, E. N. Caspi, L. Hultman, P. Eklund, J. Rosen, M. W. Barsoum and J. Vleugels, "Synthesis of the New MAX Phase  $Zr_2AlC$ ", *J. Europ. Cer. Soc.*, **36**, 1847–1853 (2016).
335. J. Gruber, A. Lange, J. Griggs, M. Taheri, G. Tucker and M. W. Barsoum, "Evidence for Bulk Ripplations in Layered Solids", *Sci. Rep.*, **6**, 33,451 (2016).
334. A. Miranda, J. Halim, M. W. Barsoum and A. Lorke, "Electronic Properties of Freestanding  $Ti_3C_2T_x$  MXene Monolayers", *Appl. Phys. Lett.*, **108**, 033102 (2016).
333. M. T. Agne and M. W. Barsoum, "Enthalpy of Formation and Thermodynamic Parameters of the MAX Phase,  $V_2AlC$ ," *J. Alloys Compds.*, **665**, 218–224 (2016).
332. S. Kota, E. Zapata-Solvas, A. Ly, J. Lu, O. Elkassabany, A. Huon, W. E. Lee, L. Hultman, S. J. May and M. W. Barsoum, "Synthesis and Characterization of an Alumina Forming Nanolaminated Boride:  $MoAlB$ ", *Sci. Rep.* **6**, 26,475 (2016).
331. A. Haddad, N. Chiker, M. Abdi, M. E. A. Benamar, M. Hadji and M.W. Barsoum, "Microstructure and Tribological Properties of Boronized  $Ti_2AlC$  MAX Surfaces", *Ceram. Inter.* **42**, 16325-16331 (2016).
330. A. Tesfaye, O. Mashtalir, M. Naguib, M. W. Barsoum, Y. Gogotsi and T. Djenizian, "Anodized  $Ti_3SiC_2$  as an Anode Material for Li-ion Batteries", *ACS Appl. Mater. Interfaces.* **8**, 16670-16676 (2016).



329. K. Hantanasirisakul, M.-Q. Zhao, P. Urbankowski, J. Halim, B. Anasori, S. Kota, C. E. Ren, M. W. Barsoum and Y. Gogotsi, "Fabrication of  $Ti_3C_2T_x$  MXene Transparent Thin Films with Tunable Optoelectronic Properties", Adv. Electron. Mater., **2**, 1600050 (2016).
328. D. J. Tallman, L. He, E. N. Hoffman, B. Garcia-Diaz, G. Kohse, R. L. Sindelar and M. W. Barsoum, "Effect of Neutron Irradiation on Defect Evolution in  $Ti_2AlC$  and  $Ti_3SiC_2$ ", J. Nucl. Mater., **468**, 194-206 (2016).
327. Y. Hadji, A. Haddad, M. Yahy, M. E. A. Benamar, D. Miroud, T. Sahraoui, M. Hadji and M. W. Barsoum, "Joining  $Ti_3SiC_2$  MAX Phase with 308 Stainless Steel and Aluminum Fillers by Tungsten Inert Gas (TIG) Brazing Process," Ceram. Inter., **42**, 1026-1035 (2016).
326. B. Anasori and M. W. Barsoum, "Energy Damping in Magnesium Alloy Composites Reinforced with  $TiC$  or  $Ti_2AlC$  Particles", Mater. Sci. Eng. A, **653**, 53–62 (2016).
325. J. Halim, S. Kota, M. Lukatskaya, M. Naguib, M. Zhao, E. J. Moon, J. Pitcock, S. J. May, Y. Gogotsi and M. W. Barsoum, "Synthesis and Characterization of Two-Dimensional Molybdenum Carbide,  $Mo_2C$  (MXene)", Adv. Funct. Mater. **26**, 3118–3127 (2016).
324. C. E. Ren, M.-Q. Zhao, T. Makaryan, J. Halim, M. Boota, S. Kota, B. Anasori, M. W. Barsoum and Y. Gogotsi, "Porous Two-Dimensional Transition Metal Carbide (MXene) Flakes for High-Performance Li-Ion Storage", ChemElectroChem, **3**, 689-693 (2016).
323. M. T. Agne, M. Radovic and M. W. Barsoum, "Stability of  $V_2AlC$  with Al in the 800 to 1000 °C Temperature Range and *in situ* Synthesis of  $V_2AlC/Al$  Composites", J. Alloys Compds., **666**, 279-286 (2016).
322. L. Wang, L.-Y. Yuan, K. Chen, Y.-J. Zhang, Q. Deng, S. Du, Q. Huang, L. Zheng, J. Zhang, C. Zhifang, M. W. Barsoum X. Wang and W.-Q. Shi, "Loading Actinides in Multi-layered Structures for Nuclear Waste Treatment: the First Case Study of Uranium Capture With Vanadium Carbide MXene", ACS Appl. Mater. Interfaces, **8**, 16396-16403 (2016).
321. M. Boota, B. Anasori, C. Voigt, M.-Q. Zhao, M. W. Barsoum and Y. Gogotsi, "Pseudocapacitive Electrodes Produced by Oxidant-Free Polymerization of Pyrrole Between the Layers of 2D Titanium Carbide (MXene)", Advan. Mater., **28**, 1517–1522 (2016).
320. T. Lapauw, J. Halim, J. Lu, T. Cabioc'h, L. Hultman, M. W. Barsoum, K. Lambrinou and J. Vleugels, "Synthesis of the  $Zr_3AlC_2$  MAX Phase", J. Europ. Cer. Soc., **36**, 943–947 (2016).
319. A. D. Dillon, M. Ghidui, A. Krick, J. Griggs, S. J. May, Y. Gogotsi, M. W. Barsoum and A. T. Fafarman, "Highly Conductive Optical Quality Solution-Processed Two-Dimensional Titanium Carbide," Adv. Funct. Mater., **26**, 4162–4168, (2016).
318. J. Halim, K. M. Cook, M. Naguib, P. Eklund, Y. Gogotsi, J. Rosen and M. W. Barsoum, "X-ray Photoelectron Spectroscopy of Two-Dimensional Transition Metal Carbides (MXenes)", Appl. Surf. Sci., **362**, 406-417 (2016).
317. P. Urbankowski, B. Anasori, T. Makaryan, D. Er, S. Kota, P. Walsh, M. Zhao, V. Shenoy, M. W. Barsoum and Yury Gogotsi, "Synthesis of Two-dimensional Titanium Nitride  $Ti_4N_3$  (MXene)", Nanoscale, **8**, 11385–11391 (2016).
316. J. Yang, M. Naguib, M. Ghidui, L.-M. Pan, J. Gu, J. Nanda, J. Halim, Y. Gogotsi and M. W. Barsoum, "Two-dimensional Nb-based  $M_4C_3$  Solid Solutions (MXenes)", J. Amer. Cer. Soc., **99**, 660–666 (2016).
315. Y. Hadji, A. Haddad, M. Yahy, M.E.A. Benamar, D. Miroud, T. Sahraoui, M. Hadji, M.W. Barsoum, On the TIG Welding-Brazing of  $Ti_3SiC_2$ /stainless steel and TIG Brazing Of  $Ti_3SiC_2$  to Itself Using an Aluminum Filler, Ceram. Inter., **42**, 1026-1035 (2016).

314. C. F. Hu, C. Li, J. Halim, S. Kota, D. Tallman and M.W. Barsoum, "On the Rapid Synthesis of the Ternary  $\text{Mo}_2\text{GaC}$ ", *J. Amer. Cer. Soc.*, **98**, 2713–2715 (2015).
313. M. Lukatskaya, S.-M. Bak, X. Yu, X.-Q. Yang, M. W. Barsoum and Y. Gogotsi, "Probing the Mechanism of High Capacitance in Two-dimensional Titanium Carbide Using In-situ X-Ray Absorption Spectroscopy", *Advan. Energy Mater.*, **5**, 1500589 (2015).
312. B. Anasori, M. Dahlgqvist, E. J. Moon, J. Lu, B. Hosler, E. Caspi, S. J. May, L. Hultman, P. Eklund, J. Rosén and M. W. Barsoum, "Experimental and Theoretical Characterization of the Ordered MAX Phases:  $\text{Mo}_2\text{TiAlC}_2$  and  $\text{Mo}_2\text{Ti}_2\text{AlC}_3$ ", *J. Appl. Phys.*, **118**, 094304 (2015).
311. M. Shamma, E. Caspi, B. Clausen, S. Vogel, D. Brown, V. Presser, S. Amini, O. Yeheskel and M. W. Barsoum, "*In situ* Neutron Diffraction Evidence For Incipient Kink Bands in Highly Textured Polycrystalline  $\text{Ti}_2\text{AlC}$ ", *Acta Mater.* **98**, 51–63 (2015).
310. G. Bentzel, M. Ghidui, B. Anasori and M. W. Barsoum, "On the Interactions of  $\text{Ti}_2\text{AlC}$ ,  $\text{Ti}_3\text{AlC}_2$ ,  $\text{Ti}_3\text{SiC}_2$  and  $\text{Cr}_2\text{AlC}$  with Silicon Carbide and Pyrolytic Carbon at 1300 °C", *J. Eur. Ceram. Soc.*, **35** 4107-4114 (2015).
309. C.-C. Lai, R. Meshkian, M. Dahlgqvist, J. Lu, L.-Å. Näslund, O. Rivin, E. N. Caspi, H. Ettetdgui, O. Ozeri, L. Hultman, P. Eklund, M. W. Barsoum and J. Rosén, "Structural and Compositional Analysis of  $\text{Mo}_2\text{Ga}_2\text{C}$  From First Principles and Thin Film Synthesis", *Acta Mater.*, **99**, 157–164 (2015).
308. R. Meshkian, L.Å Näslund, J. Halim, J. Lu, M. W. Barsoum and J. Rosen, "Synthesis of Two-dimensional Molybdenum Carbide,  $\text{Mo}_2\text{C}$ , from the Gallium-Based Atomic Laminate  $\text{Mo}_2\text{Ga}_2\text{C}$ ", *Scripta Mater.*, **108**, 147–150 (2015).
307. Z. Lin, D. Sun, Q. Huang, J. Yang, M. W. Barsoum and X. Yan, "Enhancement of Electrochemical Performance of MXene as Lithium-ion Battery Anode Material Using Carbon Nanofiber Bridges", *J. Mater. Chem. A*, **3**, 14096–14100 (2015).
306. D. Tallman, J. Yang, L. Pan, B. Anasori and M. W. Barsoum, "Reactivity of Zircaloy-4 with  $\text{Ti}_3\text{SiC}_2$  and  $\text{Ti}_2\text{AlC}$  in the 1100 °C to 1300 °C Temperature Range", *J. Nucl. Mater.*, **460**, 122–129 (2015).
305. B. Anasori, Y. Xi, M. Beidaghi, J. Lu, B. Hosler, L. Hultman, P. Kent, Y. Gogotsi and M. W. Barsoum, "Two-Dimensional, Ordered, Double Transition Metal Carbides (MXenes)", *ACS Nano*, **9**, 9507-9516 (2015). Editor's Choice and Cover.
304. M.-Q. Zhao, M. Sedran, Z. Ling, M. R. Lukatskaya, O. Mashtalir, M. Ghidui, B. Dyatkin, D. J. Tallman, T. Djenizian, M. W. Barsoum and Y. Gogotsi, "Synthesis of Carbon/Sulfur Nanolaminates by Electrochemical Extraction of Titanium from  $\text{Ti}_2\text{SC}$ ", *Angew. Chem. Int. Edition*, **127**, 4892-4896 (2015). Very Important Paper.
303. B. Anasori, J. Halim, J. Lu, C. Voigt, L. Hultman and M. W. Barsoum, " $\text{Mo}_2\text{TiAlC}_2$ : A New Ordered Layered Ternary Carbide", *Scripta Mater.*, **101**, 5–7 (2015).
302. L. H. Karlsson, J. Birch, J. Halim, M. W. Barsoum & P. O. Å. Persson, "Atomically Resolved Structural and Chemical Investigation of a Single MXene Sheet", *Nano Letts.*, **15**, 4955–4960 (2015).
301. K. Harris, M. Bugnet, M. Naguib, M. W. Barsoum and G. Goward, "Direct Measurement of Surface Termination Groups and their Connectivity in the 2D MXene  $\text{V}_2\text{CT}_x$  using NMR Spectroscopy", *J. Phys. Chem. C*, **119** 13713–13720 (2015).
300. S. J. Kim, M. Naguib, M. Zhao, C. Zhang, H.-T. Jung, M. W. Barsoum and Y. Gogotsi, "High Mass Loading, Binder-Free MXene Anodes for High Areal Capacity Li-ion Batteries", *Electrochem. Acta*, **163**, 246–251 (2015).



299. H. B. Zhang, C. F. Hu, K. Sato, S. Grasso, M. Estili, S. Q. Guo, K. Morita, H. Yoshida, T. Nishimura, T. S. Suzuki, M. W. Barsoum, B. N. Kim, Y. Sakka, "Tailoring  $Ti_3AlC_2$  Ceramic With High Anisotropic Physical and Mechanical Properties", *J. Eur. Cer. Soc.*, **35**, 393-397 (2015).
298. M.-Q. Zhao, C. E. Ren, Z. Ling, M. Lukatskaya, C.-F. Zhang, K. L. Van Aken, M. W. Barsoum and Y. Gogotsi, "Flexible MXene/Carbon Nanotube Composite Paper with High Volumetric Capacitance", *Advan. Mater.*, **27**, 339–345 (2015).
297. O. Mashtalir, M. R. Lukatskaya, M.-Q. Zhao, M. W. Barsoum and Y. Gogotsi, "Assisted Delamination of  $Nb_2C$  MXene for Li-ion Energy Storage Devices," *Advan. Mater.*, **27**, 3501–3506 (2015).
296. A. Mockute, J. Lu, E. J. Moon, M. Yang, B. Anasori, S. J. May, M. W. Barsoum and J. Rosen, "Solid Solubility and Magnetism Upon Mn Incorporation in Bulk  $Cr_2AlC$  and  $Cr_2GaC$  MAX Phases," *Mater. Res. Letts.*, **3**, 16–22 (2105).
295. G. Bentzel, N. J. Lane, S. Vogel, K. An, M. W. Barsoum and E. Caspi, "A High-Temperature Neutron Diffraction Study of  $Nb_2AlC$  and  $TiNbAlC$ ," *J. Am. Ceram. Soc.*, **97**, 570–576 (2015).
294. C. Hu, C.-C. Lai, Q. Tao, J. Lu, J. Halim, L. Sun, J. Zhang, J. Yang, B. Anasori, J. Wang, Y. Sakka, L. Hultman, P. Eklund, J. Rosen and M. W. Barsoum, " $Mo_2Ga_2C$ : A New Ternary Nanolaminated Carbide", *Chem. Comm.*, **51**, 6560-6563 (2015).
293. M. T. Agne, B. Anasori and M. W. Barsoum, "Reactions Between  $Ti_2AlC$ ,  $B_4C$  and Al and Phase Equilibria at 1000 °C in the Al-Ti-B-C Quaternary System", *J. Phase Equil. Diff.*, **36**, 169–182 (2015). **Editor's Choice Award for 2015.**
292. D. J. Tallman, E. Hoffman, E. N. Caspi, B. Garcia-Diaz, G. Kohse, R. L. Sindelar and M. W. Barsoum, "Effect of Neutron Irradiation on Select MAX Phases", *Acta Mater.*, **85**, 132–143 (2015).
291. M. Levi, M. R. Lukatskaya, S. Sigalov, M. Beidaghi, N. Shpigel, L. Daikhin, D. Aurbach, M. W. Barsoum and Y. Gogotsi, "Solving the Capacitive Paradox of 2D MXene using Electrochemical Quartz-Crystal Admittance Combined and *in situ* Electronic Conductance Measurements", *Advan. Energ. Mater.*, **5**, 1400815 (2015).

### **2014**

290. L. Shen, J. Xue, M. W. Barsoum and Q. Huang, "Rapid Bonding of  $Ti_3SiC_2$  and  $Ti_3AlC_2$  by Pulsed Electrical Current Heating", *J. Amer. Cer. Soc.*, **97**, 3721–3724 (2104).
289. M. Ghidui, M. Lukatskaya, M.-Q. Zhao, Y. Gogotsi and M. W. Barsoum, "Conductive Two-Dimensional Titanium Carbide 'Clay' with High Volumetric Capacitance", *Nature*, **516**, 78-81 (2014).
288. M. Naguib, G. Bentzel, J. Shah, J. Halim, E. Caspi, J. Lu, L. Hultman and M. W. Barsoum, "New Solid Solution MAX Phases:  $(Ti_{0.5},V_{0.5})_3AlC_2$ ,  $(Nb_{0.5},V_{0.5})_2AlC$ ,  $(Nb_{0.5},V_{0.5})_4AlC_3$  and  $(Nb_{0.8},Zr_{0.2})_2AlC$ ", *Mater. Res. Let.*, **2**, 233–240 (2014).
287. M. Naguib, O. Mashtalir, M. R. Lukatskaya, B. Dyatkin, V. Presser, Y. Gogotsi and M. W. Barsoum, "One-Step Synthesis of Nanocrystalline Titanium Oxide on Thin Sheets of Disordered Graphitic Carbon by Oxidation of MXenes", *Chem. Comm.*, **50**, 7420-7423 (2014) (Cover article).
286. Z. D. Ling, C. Ren, M. Zhao, J. Yang, J. M. Giammarco, J. Qiu, M. W. Barsoum and Y. Gogotsi, "Flexible and Conductive MXene Films and Nanocomposites with High Volumetric Capacitances", *Proc. Natl. Acad. Sci.*, **111**, 16676-16681 (2014).
285. Y. Xie, Y. Dall'Agnesse, M. Naguib, Y. Gogotsi, M. W. Barsoum, H. L. Zhuang and P. R. C. Kent, "Prediction and Characterization of MXene Nanosheet Anodes for Non-Lithium-Ion Batteries", *ACS Nano*, **8**, 9606–9615 (2014).

284. M. Ghidui, M. Naguib, O. Mashtalir, L. M. Pan, B. Zhang, J. Yang, Y. Gogotsi, C. Shi, S. J. L. Billinge and M. W. Barsoum, "Synthesis and Characterization of Two-dimensional Nb<sub>4</sub>C<sub>3</sub> (MXene)", Chem. Comm., **50**, 9517-9520 (2014).
283. Y. Xie, M. Naguib, V. N. Mochalin, M. W. Barsoum, Y. Gogotsi, X. Yu, K.-W. Nam, X.-Q. Yang, A. I. Kolesnikov and P. R. C. Kent, "Role of Surface Structure on Li-ion Energy Storage Capacity of Two-dimensional Transition Metal Carbides", J. Amer. Chem. Soc. **136**, 6385-94 (2014)
282. O. Mashtalir, K. Cook, V. N. Mochalin, M. Crowe, M. W. Barsoum and Y. Gogotsi, "Dye Adsorption and Decomposition on Two Dimensional Titanium Carbide in Aqueous Media", J. Mater. Chem. A, **2**, 14334–14338 (2014).
281. B. Anasori, E. Caspi and M. W. Barsoum, "Fabrication and Mechanical Properties of Pressureless Melt Infiltrated Magnesium Alloy Composites Reinforced with Ti<sub>2</sub>AlC and TiC Particles", Mater. Science Engin. A. **618**, 511-522 (2014).
280. C. Brusewitz, U. Vetter, H. Hofsass and M. W. Barsoum, "PAC Studies of Uniaxial Compressive Stressed Zinc, Titanium, Rutile, Ti<sub>2</sub>AlN and Nb<sub>2</sub>AlC", J. Phys.: Condens. Matter, **26** (2014) 295501.
279. Q. Z. Tao, C. F. Hu, S. Lin, H.B. Zhang, F. Z. Li, D. Qu, M. L. Wu, Y. P. Sun, Y. Sakka and M. W. Barsoum, "Coexistence of Ferromagnetic and a Re-entrant Cluster Glass State in the Layered Quaternary (Cr<sub>1-x</sub>Mn<sub>x</sub>)<sub>2</sub>GeC", Mater. Res. Letts. **2**, 192–198 (2014).
278. V. Mauchamp, M. Bugnet, E. Bellido, G. A. Botton, P. Moreau, D. Magne, T. Cabioch and M. W. Barsoum, "Enhanced and Tunable Surface Plasmons in 2D Ti<sub>3</sub>C<sub>2</sub> Multilayers: Electronic Structure vs. Boundary Effects," Phys. Rev. B. **89**, 235428 (2014).
277. M. Lukatskaya, J. Halim, B. Dyatkin, M. Naguib, Y. S. Burnova, M. W. Barsoum, and Y. Gogotsi, "Room-temperature Carbide Derived Carbon Synthesis by Electrochemical Etching of MAX Phases," Angew. Chem., Int. Edition, **53**, 4877-4880 (2014) (cover article).
276. S. Aryal, R. Sakidja, M. W. Barsoum and W.-Y. Ching, "A Genomic Approach to the Stability, Elastic and Electronic Properties of the MAX Phases", Phys. Solid Solidi B, **251**, 1480–97 (2014). (Cover article).
275. N. J. Lane, S. C. Vogel, E. N. Caspi, S. Dubois, V. Gauthier-Brunet, G. P. Bei and M. W. Barsoum, "A High-Temperature Neutron Diffraction and First-Principles Study of Ti<sub>3</sub>AlC<sub>2</sub> and Ti<sub>3</sub>(Al<sub>0.8</sub>,Sn<sub>0.2</sub>)C<sub>2</sub>", J. Amer. Cer. Soc., **97**, 570–576 (2014).
274. J. Zhou, F. Qiu, L. Shen, F. Li, J. Xue, M. W. Barsoum and Q. Huang "Pulse-Electric-Current-Aided Reactive Sintering of High Purity Zr<sub>3</sub>Al<sub>3</sub>C<sub>5</sub> Ceramics", J. Amer. Cer. Soc., **97**, 1296–302 (2014).
273. J. Halim, M. Lukatskaya, K. M. Cook, C. Smith, S. May, J. Lu, L. Hultman, Y. Gogotsi, P. Eklund and M. W. Barsoum, "Transparent Conductive Two-Dimensional Titanium Carbide Thin Films", Chem. Mater., **26**, 2374-81 (2014).
272. M. K. Patel, D. J. Tallman, J. A. Valdez, J. Aguiar, M. Tang, J. Griggs, E. Fu, Y. Wang and M. W. Barsoum, "Effect of Helium Irradiation on Ti<sub>3</sub>AlC<sub>2</sub> at 500 °C", Scripta Mater., **77**, 1–4 (2014).

### 2013

271. M. Lukatskaya, O. Mashtalir, C. E. Ren, Y. Dall'Agnesse, P. Rozier, P. L. Taberna, M. Naguib, P. Simon, M. W. Barsoum and Y. Gogotsi, "Cation Intercalation and High Volumetric Capacitance of Two-dimensional Titanium Carbide," Science, **341**, 1502-1505 (2013).
270. B. Anasori and M. W. Barsoum, "Cyclic Spherical Nanoindentation, Microcracking and Reversible Dislocation Motion in Plastically Anisotropic Solids", MRS Comm., **3**, 245-248 (2013).

269. N. J. Lane, S. C. Vogel, E. N. Caspi and M.W. Barsoum “High-temperature Neutron Diffraction Study of  $Ti_2AlC$ ,  $Ti_3AlC_2$  and  $Ti_5Al_2C_3$ ”, J. Appl. Phys. **113**, 183519 (2013).
268. M. Naguib, J. Halim, J. Lu, L. Hultman, Y. Gogotsi and M. W. Barsoum, "New Two-Dimensional Niobium and Vanadium Carbides as Promising Materials for Li-ion Batteries," J. Amer. Chem. Soc., **135**, 15966-15969, (2013).
267. D. Tallman, B. Anasori and M. W. Barsoum, “A Critical Review of the Oxidation  $Ti_2AlC$ ,  $Ti_3AlC_2$  and  $Cr_2AlC$  in Air”, Mater. Res. Letts., **1**, 115-125 (2013).
266. C. Brusewitz, I. Knorr, H. Hofsass, M. W. Barsoum and C. A. Volkert, “Single Crystal Pillar Micro-compression Tests of the MAX Phases  $Ti_2InC$  and  $Ti_4AlN_3$ ”, Scripta Mater., **69**, 303-306 (2013).
265. B. Anasori, E. Caspi, Y. Elraheb and M. W. Barsoum, “On The Oxidation of  $Ti_2GeC$  in Air”, J. Alloy Compds., **580**, 550–557 (2013).
264. Z. M. Sun, M. W. Barsoum, Y. Zhang and H. Hashimoto, “On Equilibrium Ga Intergranular Films in  $Cr_2GaC$ ”, Mater. Res. Letts., **1**, 109-113 (2103).
263. N. Lane, M. W. Barsoum, and J. Rondinelli, “Correlation Effects and Spin-orbit Interactions in Two-dimensional Hexagonal 5d Transition Metal Carbides,  $Ta_{n+1}C_n$  ( $n = 1; 2; 3$ )”, Eur. Phys. Letts., 57004 (2013).
262. O. Mashtalir, M. Naguib, B. Dyatkin, Y. Gogotsi and M. W. Barsoum, “Kinetics of Aluminum Extraction from  $Ti_3AlC_2$  in Hydrofluoric Acid”, Mater. Chem. Phys., **139**, 147-152 (2013).
261. O. Mashtalir, M. Naguib, V. N. Mochalin, Y. Dall’Agnese, M. Heon, M. W. Barsoum and Yury Gogotsi “Intercalation Compounds of 2-dimensional Carbides and Carbonitrides (MXenes)”, Nature Comm., **4**, 1716 (2013).
260. T. Cabioch, P. Eklund, V. Mauchamp, M. Jaouen and M. W. Barsoum, “Tailoring of the Thermal Expansion of  $Cr_2(Al_{1-x},Ge_x)C$  Phases”, J. Europ. Cer. Soc., **33**, 897–904 (2013).

## 2012

259. M. Kurtoglu, M. Naguib, Y. Gogotsi and M. W. Barsoum, “First Principle Study of Two-Dimensional Early Transition Metals Carbides”, MRS Comm., **2**, 133–137 (2012).
258. N. J. Lane, S. C. Vogel, G. Hug, A. Togo, L. Chaput, L. Hultman and M. W. Barsoum, “Prediction and Neutron Diffraction Measurement of Thermal Motion of Atoms in Select Ternary  $M_{n+1}AX_n$  and Binary  $MX$  Transition Metal Carbide Phases”, Phys. Rev. B. 214301 (2012).
257. J. Come, M. Naguib, M. W. Barsoum, Y. Gogotsi, P.-L. Taberna and P. Simon, “A Non-aqueous Asymmetric Cell Based on Transition Metal Carbide and Activated Carbon”, J. Electrochem. Soc. **159**, A1368-A1373 (2012).
256. D. Tallman, M. Naguib, B. Anasori and M. W. Barsoum, “Tensile Creep of  $Ti_2AlC$  in in Air in the 1000-1150 °C Temperature Range”, Scripta Mater. **66**, 805-808 (2012).
255. N. J. Lane, M. Naguib, J. Lu, L. Hultman and M. W. Barsoum, “Structure of a New Bulk  $Ti_5Al_2C_3$  MAX Phase Produced by the Topotactic Transformation of  $Ti_2AlC$ ”, J. Europ. Cer. Soc. **32**, 3485–3491 (2012).
254. N. J. Lane, M. Naguib, J. Lu, P. Eklund, L. Hultman and M. W. Barsoum, “Comment on “ $Ti_5Al_2C_3$ : A New Ternary Carbide Belonging to MAX Phases in the Ti–Al–C System”, J. Amer. Cer. Soc., **95**, 3352-3354 (2012).
253. M. Naguib, J. Come, B. Dyatkin, V. Presser, P.-L. Taberna, P. Simon, M. W. Barsoum and Y. Gogotsi, “MXene: a Promising Transition Metal Carbide Anode for Lithium-ion Batteries”, Electrochem. Commun., **16**, 61–64 (2012).

252. T. H. Scabarozzi, S. Benjamin, B. Adamson, J. Applegate, J. Roche, E. Pfeiffer, C. Steinmetz, C. Lunk, M. W. Barsoum, J. D. Hettinger and S. E. Lofland, "Combinatorial Investigation of the Stoichiometry, Electronic Transport and Elastic Properties of  $(\text{Cr}_{1-x}\text{V}_x)_2\text{GeC}$  Thin Films", Scripta Mater., **66**, 85-88 (2012).
251. M. Naguib, O. Mashtalir, J. Carle, V. Presser, J. Lu, L. Hultman, Y. Gogotsi and M. W. Barsoum, "Two-Dimensional Transition Metal Carbides", ACS Nano, **6**, 1322-1331 (2012). This paper won the Ross Coffin Purdy Award from the American Ceramic Society for the "paper judged to have made the most valuable contribution to the ceramic technical literature in 2012".
250. S. Basu, O. A. Elshrief, R. Coward, B. Anasori & M. W. Barsoum, "Microscale Deformation of (001) & (100) Rutile Single Crystals Under Spherical Nanoindentation," J. Mater. Res., **27**, 53–63, (2012).
249. A. J. Moseson, D. E. Moseson & M. W. Barsoum, "High Volume Fine Aggregate Limestone Alkali-Activated Concrete Developed By Design of Experiment", Cement Concrete Comp. **34**, 328-336 (2012).
248. V. Presser, M. Naguib, L. Chaput, A. Togo, G. Hug and M. W. Barsoum, "First-Order Raman Scattering of the MAX Phases:  $\text{Ti}_2\text{AlN}$ ,  $\text{Ti}_2\text{AlC}_{0.5}\text{N}_{0.5}$ ,  $\text{Ti}_2\text{AlC}$ ,  $(\text{Ti}_{0.5}\text{V}_{0.5})_2\text{AlC}$ ,  $\text{V}_2\text{AlC}$ ,  $\text{Ti}_3\text{AlC}_2$  and  $\text{Ti}_3\text{GeC}_2$ ", J. Raman Spec. **43**, 168-172 (2012).
247. E. N. Hoffman, D. W. Vinson, R. L. Sindelar, D. J. Tallman, G. Kohse and M. W. Barsoum, "MAX Phase Carbides and Nitrides: Properties for Future Nuclear Power Plant In-Core Applications and Neutron Transmutation Analysis", Nucl. Eng. Des., **244**, 17-24 (2012).
246. N. J. Lane, M. Naguib, V. Presser, G. Hug, L. Hultman and M. W. Barsoum, "First-Order Raman Scattering of the MAX Phases  $\text{Ta}_4\text{AlC}_3$ ,  $\text{Nb}_4\text{AlC}_3$ ,  $\text{Ti}_4\text{AlN}_3$  and  $\text{Ta}_2\text{AlC}$ ", J. Raman Spect., **43**, 954–958 (2012).
245. C. Lange, M. Hopfeld, M. Wilke, J. Schawohl, Th. Kups, M. W. Barsoum and P. Schaaf, "Pulsed Laser Deposition From a Pre-synthesized  $\text{Cr}_2\text{AlC}$  MAX Phase Target With and Without Ion-Beam Assistance", Phys. Status Solidi A, **209**, 545-552 (2012).

### 2011

244. M. W. Barsoum, T. H. Scabarozzi, S. Amini, J. D. Hettinger and S. E. Lofland, "Electrical and Thermal Properties of  $\text{Cr}_2\text{GeC}$ ", J. Amer. Cer. Soc. **94**, 4123-4126 (2011)
243. M. Naguib, V. Presser, D. Tallman, J. Lu, L. Hultman, Y. Gogotsi and M. W. Barsoum, " On the Topotactic Transformation of  $\text{Ti}_2\text{AlC}$  into a Ti-C-O-F Cubic Phase by Heating in Molten Lithium Fluoride in Air", J. Amer. Cer. Soc., **94**, 4566-4561 (2011).
242. M. Naguib, M. Kurtoglu, V. Presser, J. Lu, J. Niu, M. Heon, L. Hultman, Y. Gogotsi and M. W. Barsoum, "Two Dimensional Nanocrystals Produced by Exfoliation of  $\text{Ti}_3\text{AlC}_2$ ", Adv. Mater. **23**, 4207 (2011).
241. M. Naguib, V. Presser, N. Lane, D. Tallman, Y. Gogotsi, J. Lu, L. Hultman and M. W. Barsoum, "Synthesis of a New Nanocrystalline Titanium Aluminum Fluoride Phase by Reaction of  $\text{Ti}_2\text{AlC}$  with Hydrofluoric Acid", RSC Advances, **1**, 1493-1499 (2011).
240. N. J. Lane, S. C. Vogel and M. W. Barsoum, "Temperature-Dependent Crystal Structures of  $\text{Ti}_2\text{AlN}$  and  $\text{Cr}_2\text{GeC}$  As Determined From High Temperature Neutron Diffraction," J. Amer. Cer. Soc., **94**, 3473–3479 (2011).
239. D. Jurgens, C. Brusewitz, H. G. Gehrke, H. Hofsass, M. Nagl, M. Uhrmacher, U. Vetter, J. Mestnik-Filho and M. W. Barsoum, "Electric Field Gradients at  $^{111}\text{In}/^{111}\text{Cd}$  Probe Atoms on A-sites in 211-MAX Phases", J. Phys. Cond. Matter, **23**, 505501 (19 pp.) (2011).

238. X. He, Y. Bai, Y. Chen, C. Zhu, M. Li and M. W. Barsoum, "Phase Stability, Electronic Structure, Compressibility, Elastic and Optical Properties of a Newly Discovered  $Ti_3SnC_2$ : A First-principle Study", J. Amer. Cer. Soc., **94**, 3907–3914 (2011).
237. C. B. Spencer, J. M. Córdoba, N. Obando, A. Sakulich, M. Radovic, M. Odén, L. Hultman and M. W. Barsoum, "Phase Evaluation in  $Al_2O_3$  Fiber-Reinforced  $Ti_2AlC$  During Sintering in the 1300°C–1500°C Temperature Range", J. Amer. Cer. Soc., **94**, 3317-3334 (2011).
236. B. Anasori, K. E. Sickafus, I. O. Usov and M. W. Barsoum, "Spherical Nanoindentation Study and Effects of Ion Irradiation on the Deformation Micromechanisms of  $LiTaO_3$  Single Crystals", J. Appl. Phys., **110**, 023516 (2011).
235. X. He, Y. Bai, C. Zhu and M. W. Barsoum, "Polymorphism of Newly-Discovered  $Ti_4GaC_3$ : A First-Principle Study", Acta Mater., **59**, 5523–5533 (2011).
234. B. Yang, M. W. Barsoum and R. M. Rethinam, "Nanoscale Continuum Calculation of Basal Dislocation Core Structures in Graphite", Phil. Mag., **91**, 1441-1463 (2011).
233. Y. L. Du, Z.-M. Sun, H. Hashimoto and M. W. Barsoum, "Electron Correlation Effects in the MAX Phase  $Cr_2AlC$  From First Principles", J. Appl. Phys., **109**, 063707 (2011).
232. N. J. Lane, S. I. Simak, A. Mikhaylushkin, I. Abrikosov, L. Hultman and M. W. Barsoum, "A First Principles Study of Dislocations in HCP Metals Through the Investigation of the  $(11\bar{2}1)$  Twin Boundary", Phys. Rev. B, **84**, 184101 (2011).
231. M. Shamma, V. Presser, B. Clausen, D. Brown, O. Yeheskel and M. W. Barsoum, "On the Response of  $Ti_2SC$  to Stress Studied by *in situ* Neutron Diffraction and the Elasto-Plastic Self-Consistent Approach", Scripta Mater., **65**, 573-576 (2011).
230. N. J. Lane, P. Eklund, J. Lu, C. B. Spencer, L. Hultman and M. W. Barsoum, "High-temperature Phase Stability of  $\alpha$ - $Ta_4AlC_3$ ", Mater. Res. Bull., **46**, 1088-1091 (2011).
229. K. J. D. MacKenzie, M. E. Smith, A. Wong, J. V. Hanna and M. W. Barsoum, "Were the Casing Stones of Snefru's Bent Pyramid in Dahshour Cast or Carved? – Multinuclear NMR Evidence", Mater. Lett., **65**, 350-352 (2011).
228. A. Kontsos, T. Loutas, V. Kostopoulos, K. Hazeli, B. Anasori and M. W. Barsoum, "Nanocrystalline Mg-Matrix Composites: Mechanical Behavior Characterization via Acoustic Emission Monitoring", Acta Mater., **59**, 5716-5727 (2011).
227. O. Yeheskel, I. C. Ismail, B. Anasori and M. W. Barsoum, "Mechanical and Elastic Properties of Fine-Grained Polycrystalline Scandia and Erbium as Determined By Indentation Techniques", J. Europ. Cer. Soc., **31**, 1703–1712 (2011).
226. C. B. Spencer, J. Córdoba, N. Obando, M. Radovic, M. Odén, L. Hultman and M. W. Barsoum, "On the Reactivities of  $Ti_2AlC$  and  $Ti_3SiC_2$  with SiC Fibers and Powders up to Temperatures of 1550°C", J. Amer. Cer. Soc. **94**, 1737–1743 (2011).
225. A. Mendoza-Galván, M. Rybka, K. Järrendahl, H. Arwin, M. Magnuson, L. Hultman and M. W. Barsoum, "Spectroscopic Ellipsometry Study of the Dielectric Function of Bulk  $Ti_2AlN$ ,  $Ti_2AlC$ ,  $Nb_2AlC$ ,  $(Ti_{0.5}Nb_{0.5})_2AlC$  and  $Ti_3GeC_2$  MAX Phases", J. Appl. Phys., **109**, 013530 (2011).

## 2010

224. X. He, Y. Bai, C. Zhu, Y. Sun M. Li and M. W. Barsoum, "General Trends in the Structural, Electronic and Elastic Properties of the  $M_3AlC_2$  phases ( $M$  = transition metal): A First-principle Study", Comput. Mater. Scien., **49**, 691-698 (2010).



223. N. J. Lane, S. C. Vogel and M. W. Barsoum, "High Temperature Neutron Diffraction and the Temperature-Dependent Crystal Structures of  $Ti_3SiC_2$  and  $Ti_3GeC_2$ ", Phys. Rev. B, **82**, 174109 (2010).
222. D. Jürgens, M. Uhrmacher, H. Hofsäss, J. Mestnik-Filho and M. W. Barsoum, "Perturbed Angular Correlation Studies of the MAX Phases  $Ti_2AlN$  and  $Cr_2GeC$  Using Ion Implanted  $^{111}In$  as Probe Nuclei", Nucl. Instrum. Meth. Phys. Resear. B, **268**, 2185-2188 (2010).
221. E. Jud, S. Miller, A. R. Sakulich, K. MacKenzie and M. W. Barsoum, "Pozzolanic Activity of Diatomaceous Earth", J. Amer. Cer. Soc., **93**, [10] 3406-3410 (2010).
220. S. Miller, A. Sakulich, M. W. Barsoum and E. Jud, "Use of Diatomaceous Earth as a Pozzolon in the Formation of an Alkali Activated Fine-Aggregate Limestone Concrete", J. Amer. Cer. Soc., **93**, 2828-2836 (2010).
219. A. R. Sakulich, S. Miller and M. W. Barsoum, "Chemical and Microstructural Characterization of 20-Month Old Alkali Activated Slag Cements", J. Amer. Cer. Soc., **93**, 1741-1748 (2010).
218. B. Manoun, S. Kulkarni, N. Pathak, S. K. Saxena, S. Amini and M. W. Barsoum, "Bulk Moduli of  $Cr_2GaC$  and  $Ti_2GaN$  up 50 GPa", J. Alloy Compds., **505**, 328-331 (2010).
217. I. C. Albayrak, S. Basu, A. Sakulich, O. Yeheskel and M. W. Barsoum, "On the Elastic and Mechanical Properties of Polycrystalline Transparent Yttria as Determined By Indentation Techniques", J. Amer. Cer. Soc., **93**, 2028-2034 (2010).
216. A. Zhou, D. Brown, S. Vogel, O. Yeheskel and M. W. Barsoum, "On the Kinking Nonlinear Elastic Deformation of Polycrystalline Cobalt", Mater. Sci. Engin. A, **527**, 4664-4673 (2010).
215. S. Amini and M. W. Barsoum, "On the Effect of Texture on the Mechanical Properties of Nanocrystalline Mg-Matrix Composites Reinforced with MAX Phases", Mater. Sci. Engin. A, **527**, 3707-3718 (2010).
214. A. Zhou, S. Basu, P. Finkel, G. Friedman and M. W. Barsoum, "Hysteresis in Kinking Nonlinear Elastic Solids and the Preisach-Mayergoyz Model", Phys. Rev. B, **82**, 094105 (10 pp) (2010).
213. A. G. Zhou and M. W. Barsoum, "Kinking Nonlinear Elastic Deformation of  $Ti_3AlC_2$ ,  $Ti_2AlC$ ,  $Ti_3Al(C_{0.5},N_{0.5})_2$  and  $Ti_2Al(C_{0.5},N_{0.5})$ ", J. Alloys Compds., **498**, 62-67 (2010).
212. A. R. Sakulich, E. Anderson, C. Schauer and M. W. Barsoum, "Influence of Si:Al Ratio on the Microstructural and Mechanical Properties of a Fine-Limestone Aggregate Alkali-Activated Slag Concrete", Materials Structures, **43**, 1025–1035 (2010).
211. F. Barcelo, S. Doriot, T. Cozzika, M. Le Flem, J.-L. Béchade, M. Radovic and M. W. Barsoum, "Electron-Backscattered Diffraction and Transmission Electron Microscopy Microstructural Study of Post-Creep  $Ti_3SiC_2$ ", J. Alloy Compds., **488**, 181–189, (2010).
210. R. M. Rethinam, B. Yang, S. Mall and M. W. Barsoum, "An Integral-Equation Formulation of Nonlinear Deformation in a Stack of Buffered Plates", Engin. Analys. Bound. Elem., **34**, 1113–1119 (2010).

## 2009

209. T. H. Scabarozzi, S. Amini, O. Leaffer, A. Ganguly, S. Gupta, W. Tambussi, S. Clipper, J.E. Spanier, M.W. Barsoum' J.D. Hettinger, S.E. Lofland, "Thermal Expansion of Select MAX Phases Measured by High Temperature X-ray Diffraction and Dilatometry", J. Appl. Phys., **105**, 013543 (2009).
208. B. Manoun, O. Leaffer, S. Gupta, E. N. Hoffman, S. K. Saxena, J. Spanier and M. W. Barsoum, "On the Compression Behavior of  $Ti_2InC$ ,  $(Ti_{0.5},Zr_{0.5})_2InC$ , and  $M_2SnC$  ( $M = Ti, Nb, Hf$ ) to Quasi-Hydrostatic Pressures Above 50 GPa", Solid State Comm. **149**, 1978, (2009).



207. Y. L. Du, Z.-M. Sun, H. Hashimoto and M. W. Barsoum “Theoretical Investigations on the Elastic and Thermodynamic Properties of  $Ti_2AlC_{0.5}N_{0.5}$  Solid Solution”, Phys. Lett. A, **374** 78–82 (2009).
206. S. Amini, J. M. Córdoba Gallego, L. Daemen, A. R. McGhie, C. Ni, M. Odén, L. Hultman and M. W. Barsoum, “On the Stability of Mg Nanograins to Coarsening after Repeated Melting”, Nano Letters, **9**, 3082–3086 (2009).
205. S. R. Kulkarni, M. Merlini, N. Phatak, S. K. Saxena, G. Artioli, S. Amini and M. W. Barsoum, “Thermal Expansion and Stability of  $Ti_2SC$  in Air and Inert Atmospheres”, J. Alloy Compnds., **469**, 395-400 (2009).
204. T. H. Scabarozi, C. Gennaoui, J. Roche, T. Flemming, K. Wittenberger, P. Hann, B. Adamsom, A. Rosenfeld, M. W. Barsoum, J. D. Hettinger and S. E. Lofland, “Combinatorial Investigation of  $(Ti_{1-x}Nb_x)_2AlC$ ”, Appl. Phys. Lett., **95**, 101907 (2009).
203. P. Finkel, A. G. Zhou, S. Basu, O. Yeheskel and M. W. Barsoum, ”Direct Observation of Nonlinear Acousto-Elastic Hysteresis in Kinking Nonlinear Elastic Solids,” Appl. Phys. Lett., **94**, 241904 (2009).
202. D. Filimonov S. Gupta, T. Palanisamy and M. W. Barsoum, “Effect of Applied Load and Surface Roughness on the Tribological Properties of Ni-Based Superalloys Versus  $Ta_2AlC/Ag$  or  $Cr_2AlC/Ag$  Composites”, Tribo. Lett., **33**, 9-20 (2009).
201. S. Basu, A. Zhou and M. W. Barsoum, “On Spherical Nanoindentations, Kinking Nonlinear Elasticity of Mica Single Crystals and Their Geological Implications”, J. Struct. Geology, **31**, 791–801 (2009).
200. T. H. Scabarozi, J. Roche, A. Rosenfeld, S. H. Lim, L. Salamanca-Riba, I. Takeuchi, M. W. Barsoum, J. D. Hettinger, S. E. Lofland, “Synthesis and Characterization of  $Nb_2AlC$  Thin Films”, Thin Solid Films, **517**, 2920-2933 (2009).
199. S. Amini, C. Ni and M. W. Barsoum, “Processing, Microstructural Characterization and Damping of a  $Ti_2AlC/Nanocrystalline$  Mg-Matrix Composite”, Comp. Scien. Techn., **69**, 414–420 (2009).
198. A. R. Sakulich, E. Anderson, C. Schauer, and M. W. Barsoum, “Mechanical and Microstructural Characterization of an Alkali Activated Slag/Limestone Fine Aggregate Concrete”, Const. Build. Mater. **23**, 2951-2957 (2009).
197. A. Zhou and M. W. Barsoum, “Kinking Nonlinear Elasticity and the Deformation of Magnesium”, Met. Mater. Trans., **40A**, 1741-1756 (2009).
196. R. Buchs, S. Basu, O. Elshrief, R. Coward and M. W. Barsoum, “Vickers and Spherical Nanoindentation Study of the Deformation of Poled  $BaTiO_3$  Single Crystals”, J. Appl. Phys., **105**, 093540 (2009).
195. S. Amini, A. R. McGhie and M. W. Barsoum, “On the Isothermal Oxidation of  $Ti_2SC$  in Air”, J. Electrochem. Soc., **156**, P101-106 (2009).
194. S. Gupta, D. Filimonov, V. Zaitsev, T. Palanisamy, T. El-Raghy and M. W. Barsoum, “Study of Tribofilms Formed During Dry Sliding of  $Ta_2AlC/Ag$  or  $Cr_2AlC/Ag$  Composites Against Ni-based Superalloys and  $Al_2O_3$ ”, Wear, **267**, 1490-1500, (2009).
- 2008**
193. S. Kulkarni, S. Vennila, N. Phatak, S. K. Saxena, C. S. Zha, T. El-Raghy, M. W. Barsoum, W. Luo and R. Ahuja, “Study of  $Ti_2SC$  Under Compression up to 47 GPa”, J. Alloy Compnds. **448**, L1-L4 (2008).
192. E. N. Hoffman, G. Yushin, B. G. Wendler, M. W. Barsoum, Y. Gogotsi, “Carbide Derived Carbon Membrane”, Mater. Chem. Phys., **112**, 587–59 (2008).

191. S. Basu, M. Radovic and M. W. Barsoum, "Room Temperature Constant-Stress Creep of a Brittle Solid Studied by Spherical Nanoindentation", *J. Appl. Phys.*, **104**, 063522 (2008).
190. N. Haddad, E. Garcia-Caurel, L. Hultman, M. W. Barsoum and G. Hug, "Dielectric Properties of  $Ti_2AlC$  and  $Ti_2AlN$  MAX Phases: the Conductivity Anisotropy", *J. Appl. Phys.* **104**, 023531 (2008).
189. T. Scabarozi, A. Ganguly, J. D. Hettinger, S. E. Lofland, S. Amini, P. Finkel, T. El-Raghy and M. W. Barsoum, "Electronic and Thermal Properties of  $Ti_3Al(C_{0.5},N_{0.5})_2$ ,  $Ti_2Al(C_{0.5},N_{0.5})$  and  $Ti_2AlN$ ", *J. Appl. Phys.*, **104**, 073713 (2008).
188. S. Basu, A. Zhou and M. W. Barsoum, "Reversible Dislocation Motion under Contact Loading in  $LiNbO_3$  Single Crystals", *J. Mater. Res.*, **23**, 1134-1138 (2008).
187. S. Li, R. Ahuja, M. W. Barsoum, P. Jena, and B. Johansson, "Optical Properties of  $Ti_3SiC_2$  and  $Ti_4AlN_3$ ", *Appl. Phys. Lett.*, **92**, 221907 (2008).
186. A. G. Zhou, S. Basu and M. W. Barsoum, "Kinking Nonlinear Elasticity, Damping and Microyielding of Hexagonal Closed-Packed Metals", *Acta Mater.*, **59**, 60-67 (2008).
185. A. J. Moseson, S. Basu and M. W. Barsoum, "On the Determination of The Effective Zero Point Of Contact For Spherical Nanoindentation", *J. Mater. Res.*, **23**, 204-209 (2008).
184. S. Amini, A. Zhou, A. DeVillier, S. Gupta, P. Finkel and M. W. Barsoum, "Synthesis, Elastic and Mechanical Properties of  $Cr_2GeC$ ", *J. Mater. Res.*, **23**, 2157-2165 (2008).
183. E. N. Hoffman, G. Yushin, T. El-Raghy, Y. Gogotsi and M. W. Barsoum, "Micro and Mesoporosity of Carbon Derived from Metal Carbides", *Micropor. Macropor. Mater.*, **112** 526-532 (2008).
182. T. H. Scabarozi, P. Eklund, J. Emmerlich, H. Högberg, T. Meehan, J. D. Hettinger, P. Finkel, S. E. Lofland, L. Hultman and M. W. Barsoum, "Weak Electronic Anisotropy in the Layered Nanolaminate  $Ti_2GeC$ ", *Solid State Comm.* **146**, 498-501 (2008).
181. M. Radovic, A. Ganguly and M. W. Barsoum, "Elastic Properties and Phonon Conductivities of  $Ti_3Al(C_{0.5},N_{0.5})_2$  and  $Ti_2Al(C_{0.5},N_{0.5})$  Solid Solutions", *J. Mater. Res.*, **23**, 1517-1521 (2008).
180. S. Gupta, D. Filimonov, V. Zaitsev, M. W. Barsoum and T. Palanisamy, "Ambient and 550 °C Tribological Behavior of Select MAX Phases Against Ni-based Superalloys", *Wear*, **264**, 270-278 (2008).
179. D. Filimonov, S. Gupta, T. Palanisamy and M. W. Barsoum, "Tribological Behavior of Select MAX Phases Against  $Al_2O_3$  at Elevated Temperatures", *Wear*, **265**, 560-565 (2008).
178. M. K. Drulis, H. Drulis, A. E. Hackemer, O. Leaffer, J. Spanier, S. Amini, M. W. Barsoum T. Guilbert and T. El-Raghy, "On the Heat Capacities of  $Ta_2AlC$ ,  $Ti_2SC$  and  $Cr_2GeC$ ", *J. Appl. Phys.*, **104**, 23526 (7 pp.) (2008).
177. T. H. Scabarozi, S. Amini, P. Finkel, O. D. Leaffer, J. E. Spanier, M. W. Barsoum, M. Drulis, H. Drulis, W. M. Tambussi, J. D. Hettinger and S. E. Lofland, "Electrical, Thermal, and Elastic Properties of the MAX-Phase  $Ti_2SC$ ", *J. Appl. Phys.*, **104**, 033502 (2008).

### 2007

176. B. Manoun, H. Yang, S. K. Saxena, A. Ganguly, M. W. Barsoum, Z. X. Liu, M. Lachkar, B. El Bali, "Infrared Spectrum and Compressibility of  $Ti_3GeC_2$  to 51 GPa", *J. Alloys Comps.* **433**, 265-268 (2007).
175. S. Gupta, S. Amini, D. Filimonov, T. Palanisamy, T. El-Raghy and M. W. Barsoum, "Tribological Behavior of  $Ti_2SC$  at Ambient and Elevated Temperatures", *J. Amer. Cer. Soc.*, **90**, 3566-3571 (2007).
174. D. Jurgens, M. Uhrmacher, H. Hofsass, J. Roder, P. Wodniecki, A. Kulinska, M. W. Barsoum "First

- PAC experiments in MAX-phases”, Hyperfine Interactions, **178**, 23-30 (2007).
173. O. D. Leaffer, S. Gupta, M. W. Barsoum and J. E. Spanier, “On the Raman Scattering from Selected  $M_2AC$  Compounds”, J. Mater. Res., **22**, 2651-2654 (2007).
172. V. V. Panic, V. M. Jovanovic, S. I. Terzic, M. W. Barsoum, V. D. Jovic and A. B. Dekanski “The Properties of Electroactive Ruthenium Oxide Coatings Supported by Titanium-based Ternary Carbides”, Surface Coatings Tech., **202**, 319-324 (2007).
171. S. Gupta, D. Filimonov, T. Palanisamy, T. El-Raghy and M. W. Barsoum, “ $Ta_2AlC$  and  $Cr_2AlC$  Ag-based Composites - New Solid Lubricant Materials for Use Over a Wide Temperature Range Against Ni-based Superalloys”, Wear, **262**, 1479-1489 (2007).
170. B. Manoun, S. Amini, S. Gupta, S. K. Saxena and M. W. Barsoum, “On the Compression Behavior of  $Cr_2GeC$  and  $V_2GeC$  to Quasi-hydrostatic Pressures of 50 GPa”, J. Phys.: Condens. Matter., **19**, 456218 (7 pp) (2007).
169. S. Amini, M. W. Barsoum and T. El-Raghy, “Synthesis and Mechanical Properties of Fully Dense  $Ti_2SC$ ”, J. Amer. Cer. Soc., **90**, 3953-3958 (2007).
168. B. Manoun, F. Zhang, S. K. Saxena, S. Gupta and M. W. Barsoum, “On the Compression Behavior of  $(Ti_{0.5}, V_{0.5})_2AlC$  and  $(Ti_{0.5}, Nb_{0.5})_2AlC$  to Quasi-Hydrostatic Pressures Above 50 GPa”, J. Phys. Conds. Matter, **19**, 246215 (8 pp) (2007).
167. P. Eklund, A. Murugaiyah, J. Emmerlich, Zs. Czigany, J. Frodelius, M. W. Barsoum, H. Högberg and L. Hultman, “Homoepitaxial Growth of Ti-Si-C MAX-Phase Thin Films on Bulk  $Ti_3SiC_2$  Substrates”, J. Cryst. Growth, **304**, 264-269 (2007).
166. Z.-M. Sun, H. Hashimoto and M. W. Barsoum, “On the Effect of Environment on the Spontaneous Growth of Lead Whiskers From Commercial Brasses at Room Temperature”, Acta Mater., **55**, 3387-3396 (2007).
165. C. Lange, M. W. Barsoum and P. Schaaf, “Towards the Synthesis of MAX Phase Functional Coatings by Pulsed Laser Deposition”, Appl. Surf. Scien., **254**, 1232-1235 (2007).
164. S. Kulkarni, M. Merlini, N. Phatak, S. K. Saxena, G. Artioli, S. Gupta and M. W. Barsoum, “High Temperature Thermal Expansion and Stability of  $V_2AlC$  Up to 950 °C”, J. Amer. Cer. Soc., **90**, 3013-3016 (2007).
163. S. Basu, M. W. Barsoum, A. D. Williams and T. D. Moustakas, “Spherical Nanoindentations and Deformation Mechanisms in Free-Standing GaN Films”, J. Appl. Phys., **100**, 083522 (2007).
162. A. Ganguly, M. W. Barsoum and R. D. Doherty, “Interdiffusion Between  $Ti_3SiC_2$ - $Ti_3GeC_2$  and  $Ti_2AlC$ - $Nb_2AlC$  Diffusion Couples”, J. Amer. Cer. Soc., **90**, 2200-2204 (2007).
161. S. Basu and M. W. Barsoum, “On the Use of Spherical Nanoindentations to Determine the Deformation Micromechanics of ZnO Single Crystals”, J. Mater. Res., **22**, 2470-2477 (2007).
160. B. Manoun, S. K. Saxena, G. Hug, A. Ganguly, E. N. Hoffman & M. W. Barsoum, “Synthesis and Compressibility of  $Ti_3(Al_{1.0}Sn_{0.2})C_2$  and  $Ti_3Al(C_{0.5}, N_{0.5})_2$ ”, J. Appl. Phys., **101**, 113523 (2007).
159. M. K. Drulis, H. Drulis, A. E. Hackemer, A. Ganguly, T. El-Raghy and M. W. Barsoum, “On the Low Temperature Heat Capacities of  $Ti_2AlN$  and  $Ti_2Al(C_{0.5}, N_{0.5})$ ”, J. Alloys Compds., **433**, 59-62 (2007).

## 2006

158. B. Manoun, R. P. Gulve, S. K. Saxena, S. Gupta, M. W. Barsoum and C. S. Zha, “Compression behavior of  $M_2AlC$  ( $M=Ti, V, Cr, Nb, \text{ and } Ta$ ) phases to above 50 GPa”, Phys. Rev. B, **73**, 024110 (2006).

157. S. Basu, A. Moseson and M. W. Barsoum, "On the Determination of Indentation Stress-Strain Curves Using Spherical Indenters", *J. Mater. Res.*, **21**, 2628-2637 (2006).
156. Z.-M. Sun, and M. W. Barsoum, "Alternate Mechanism for the Spontaneous Formation of Freestanding Ga Nanoribbons on Cr<sub>2</sub>GaC Surfaces", *J. Mater. Res.*, **21**, 1629-1631 (2006).
155. S. E. Lofland, J. D. Hettinger, T. Meehan, A. Bryan, P. Finkel, S. Gupta, M.W. Barsoum and G. Hug, "Electron-Phonon Coupling in MAX Phase Carbides", *Phys. Rev. B*, **74**, 174501 (2006).
154. B. Manoun, S. K. Saxena, T. El-Raghy and M. W. Barsoum, "High-Pressure X-ray Diffraction Study of Ta<sub>4</sub>AlC<sub>3</sub>", *Appl. Phys. Letts.*, **88**, 201902 (2006).
153. M. Fraczkiewicz, A. G. Zhou and M. W. Barsoum, "Mechanical Damping in Porous Ti<sub>3</sub>SiC<sub>2</sub>", *Acta Mater.*, **54**, 5261-5270 (2006).
152. H. Yang, B. Manoun, R. T. Downs, A. Ganguly and M.W. Barsoum "Crystal Chemistry of the Ternary Layered Carbide, Ti<sub>3</sub>(Si<sub>0.43</sub>,Ge<sub>0.57</sub>)C<sub>2</sub>", *J. Phys. Chem. Solids*, **67**, 2512-2516 (2006).
151. M. W. Barsoum, A. Ganguly and G. Hug, "Microstructural Evidence for Reconstituted Limestone Blocks in the Great Pyramids of Egypt", *J. Amer. Cer. Soc.*, **89**, 3788-3796 (2006).
150. S. Gupta, D. Filimonov and M. W. Barsoum, "Isothermal Oxidation of Ta<sub>2</sub>AlC in Air", *J. Amer. Cer. Soc.*, **89**, 2974-2976 (2006).
149. V. Jovic, M. W. Barsoum, B. Jovic, A. Ganguly and T. El-Raghy, "Corrosion Behavior of Ti<sub>3</sub>GeC<sub>2</sub> and Ti<sub>2</sub>AlN in 1 M NaOH", *J. Electrochem. Soc.*, **153**, B238-B243 (2006).
148. M. K. Drulis, H. Drulis, S. Gupta, T. El-Raghy and M. W. Barsoum, "On the Heat Capacities of M<sub>2</sub>AlC (M = Ti, V, Cr) Ternary Carbides", *J. Appl. Phys.*, **99**, 093502 (2006).
147. S. Basu, M. W. Barsoum and S. R. Kalidindi, "Sapphire: A Kinking Nonlinear Elastic Solid", *J. Appl. Phys.*, **99**, 063501 (2006).
146. V. Jovic, B. Jovic, S. Gupta, T. El-Raghy and M. W. Barsoum, "Corrosion Behavior of Select MAX Phases in NaOH, HCl and H<sub>2</sub>SO<sub>4</sub>", *Corr. Science*, **48**, 4274-4282 (2006).
145. M. Radovic, M. W. Barsoum, A. Ganguly, T. Zhen, P. Finkel, S. R. Kalidindi and E. Lara-Curzio, "On the Elastic Properties and Mechanical Damping of Ti<sub>3</sub>SiC<sub>2</sub>, Ti<sub>3</sub>GeC<sub>2</sub>, Ti<sub>3</sub>Si<sub>0.5</sub>Al<sub>0.5</sub>C<sub>2</sub> and Ti<sub>2</sub>AlC in the 300-1573 K Temperature Range", *Acta Mater.*, **54**, 2757-2767 (2006).
144. G. Yushin, E. N. Hoffman, M. W. Barsoum, Y. Gogotsi, C. A. Howell, S. R. Sandeman, G. J. Phillips, A. W. Lloyd and S. V. Mikhalovsky, "Mesoporous Carbide-Derived Carbon with Porosity Tuned for Efficient Adsorption of Cytokines", *Biomaterials*, **27**, 5755-5762 (2006).
143. S. Gupta, A. Ganguly, D. Filimonov and M. W. Barsoum, "Oxidation of Ti<sub>3</sub>GeC<sub>2</sub> and Ti<sub>3</sub>Ge<sub>0.5</sub>Si<sub>0.5</sub>C<sub>2</sub> in Air", *J. Electrochem. Soc.*, **153**, (7) J61-J68 (2006).
142. S. R. Kalidindi, T. Zhen and M. W. Barsoum, "Macroscale Constitutive Modeling of Kinking Nonlinear Elastic Solids", *Mater. Sci. Engin. A*, **418**, 95-98 (2006).
141. A. G. Zhou, M. W. Barsoum, S. Basu, S. R. Kalidindi, T. El-Raghy, "Incipient and Regular Kink Bands in Dense and 10 vol. % Porous Ti<sub>2</sub>AlC", *Acta Mater.* **54**, 1631-1639 (2006).
140. S. Gupta, E. N. Hoffman, M. W. Barsoum, "Synthesis and Oxidation of Ti<sub>2</sub>InC, Zr<sub>2</sub>InC, (Ti<sub>0.5</sub>Zr<sub>0.5</sub>)<sub>2</sub>InC and (Ti<sub>0.5</sub>Hf<sub>0.5</sub>)<sub>2</sub>InC in Air", *J. Alloy Compds.*, **426**, 168-175 (2006).
139. B. Manoun, S. K. Saxena, T. El-Raghy and M. W. Barsoum, "X-ray High-Pressure Study of Ti<sub>2</sub>AlN and Ti<sub>2</sub>AlC", *J. Phys. Chem. Solids*, **67**, 2091-2094 (2006).

**2005**

138. J. E. Spanier, S. Gupta, M. Amer and M. W. Barsoum, "First-Order Raman Scattering From the  $M_{n+1}AX_n$  Phases", Phys. Rev. B, **71**,12103 (2005).
137. Z.-M. Sun, T. Zhen and M. W. Barsoum, "Creep Rupture Induced Silica-Based Nanofibers Formed on Fracture Surfaces of  $Ti_3SiC_2$ ", J. Mater. Res., **20**, 2895-2897 (2005).
136. J. D. Hettinger, S. E. Lofland, P. Finkel, T. Meehan, J. Palma, K. Harrell, S. Gupta, A. Ganguly, T. El-Raghy and M. W. Barsoum, "Elastic, Electrical and Thermal Properties of  $M_2AlC$  ( $M = Ti, Cr, Nb$  and  $V$ ) Phases", Phys. Rev. B, 115120, (2005).
135. Z.-M. Sun, S. Gupta, H. Ye and M. W. Barsoum, "Spontaneous Growth of Free-standing Ga Nanoribbons from  $Cr_2GaC$  Surfaces", J. Mater. Res., **20**, 2618-2621 (2005).
134. E. Hoffman, M. W. Barsoum, W. Wang, R. D. Doherty and A. Zavalangos, "On the Spontaneous Growth of Soft Metal Whiskers", IEEE Holm Conf. Proc. 121-126, (2005).
133. Z.-M. Sun, A. Murugaiah, T. Zhen, A. Zhou and M. W. Barsoum, "Microstructure and Mechanical Properties of Porous  $Ti_3SiC_2$ ", Acta Mater., **53**, 4359-4366 (2005).
132. N. Keawprak, Z.-M. Sun, H. Hashimoto and M. W. Barsoum, "Effect of Sintering Temperature on the Thermoelectric Properties of Pulse Discharge Sintered  $(Bi_{0.24}Sb_{0.76})Te_3$  Alloy". J. Alloy Comps., **397**, 236-244 (2005)
131. Z. M. Sun, H. Hashimoto, N. Keawprak, A. B. Ma, L. F. Li and M. W. Barsoum, "Effect of Rotary-Die Equal Channel Angular Pressing on the Thermoelectric Properties of a  $(Bi,Sb)_{22}Te_3$  Alloy", J. Mater. Res., **20**, 895-903 (2005).
130. B. Manoun, S. K. Saxena, H.-P. Liermann and M. W. Barsoum, "Thermal Expansion of Polycrystalline  $Ti_3SiC_2$  in the 25–1400 °C Temperature Range", J. Amer. Cer. Soc., **88**, 3489-3491 (2005).
129. T. Zhen, M. W. Barsoum and S. R. Kalidindi, "Effects of Temperature, Strain Rate and Grain Size on the Compressive Properties of  $Ti_3SiC_2$ ", Acta Mater. 53 4163–4171 (2005).
128. T. Zhen, M. W. Barsoum, S. R. Kalidindi, M. Radovic, Z.-M. Sun and T. El-Raghy, "Compressive Creep of Fine and Coarse-Grained  $Ti_3SiC_2$  in Air in the 1100 to 1300 °C Temperature Range in Air", Acta Mater., **53**, 4963-4973 (2005).
127. J. Chmiola, G. Yushin, R. K. Dash, E. Hoffman, J. E. Fischer, M. W. Barsoum and Y. Gogotsi, "Double-Layer Capacitance of Carbide Derived Carbons in Sulphuric Acid", Electrochem. Solid State Lett. **8**, A357-A360 (2005).
126. B. Manoun, S. K. Saxena and M. W. Barsoum, "High Pressure Study of  $Ti_4AlN_3$  to 55 GPa", Appl. Phys. Lett., **86**, 101906, 2005.
125. M. W. Barsoum, M. Radovic, T. Zhen and P. Finkel, "Dynamic Elastic Hysteretic Solids and Dislocations", Phys. Rev. Lett., **94**, 085501, 2005.
124. M. K. Drulis, A. Czopnik, H. Drulis, J. E. Spanier, A. Ganguly & M. W. Barsoum, "On the Heat Capacity of  $Ti_3GeC_2$ ", Mater. Sci. & Engin. B, **119**, 159-163, 2005.
123. Z.-M. Sun and M. W. Barsoum, "Spontaneous Room Temperature Extrusion of Pb Nano-Whiskers from Lead Brass Surfaces", J. Mater. Res., **20**, 1087-1089 (2005).
122. R. S. Kumar, S. Rekhi, A. L. Cornelius and M. W. Barsoum, "Compressibility of  $Nb_2AsC$  to 41 GPa", Appl. Phys. Lett., **86**, 111904 (2005).
121. G. Hug, M. Jaouen and M. W. Barsoum, "XAS, EELS and Full-Potential Augmented Plane Wave Study of the Electronic Structures of  $Ti_2AlC$ ,  $Ti_2AlN$ ,  $Nb_2AlC$  and  $(Ti_{0.5},Nb_{0.5})_2AlC$ ", Phys. Rev. B,



71, 24105 (2005).

120. M. W. Barsoum, T. Zhen, A. Zhou, S. Basu and S. R. Kalidindi, “Microscale Modeling of Kinking Nonlinear Elastic Solids”, *Phys. Rev. B.*, **71**, 134101 (2005).
119. G. Yushin, E. Hoffman, A. Nikitin, H. Ye, M. W. Barsoum and Y. Gogotsi, “Synthesis of Nanoporous Carbide-Derived Carbon by Chlorination of Titanium Silicon Carbide”, *Carbon*, **43**, 2075-82 (2005).
118. A. Ganguly, M. W. Barsoum and J. Schuster, “The 1300 °C Isothermal Section in the Ti-In-C Ternary Phase Diagram”, *J. Amer. Cer. Soc.*, **88**, 1290-1296 (2005).
117. E. N. Hoffman, G. Yushin, M. W. Barsoum and Y. Gogotsi, “Synthesis of Carbide-Derived Carbon by Chlorination of  $Ti_2AlC$ ”, *Chem. Mater.* **17**, 2317-2322 (2005).
116. A. Souchet, J. Fontaine, M. Belin, T. Le Mogne, J.-L. Loubet and M. W. Barsoum, “ $Ti_3SiC_2$ : Tribological Duality”, *Tribology Letters*, **18**, pp. 341-352 (2005).

#### 2004

115. V. D. Jovic and M. W. Barsoum, “Corrosion Behavior and Passive Films Characteristics Formed on Ti,  $Ti_3SiC_2$  and  $Ti_4AlN_3$  in 1 M  $H_2SO_4$  and 1 M HCl Solutions”, *J. Electrochem. Soc.*, **151**, B71-B76 (2004).
114. Z. Wang, S. Zha and M. W. Barsoum, “Compressibility and Pressure Induced Phase Transformation in  $Ti_3GeC_3$ ”, *Appl. Phys. Letters*, **85**, 3453-3455 (2004).
113. M. W. Barsoum, E. Hoffman, R. D. Doherty, S. Gupta & A. Zavaliangos, “Driving Force & Mechanism of Spontaneous Metal Whisker Formation”, *Phys. Rev. Letts.*, **93**, 206104 (2004).
112. B. Manoun, S. K. Saxena, H. P. Liermann, R. Gulve, E. L. Hoffman, M. W. Barsoum, S. Zha and G. Hug, “Compression of  $Zr_2InC$  to 52 GPa”, *Appl. Phys. Lett.*, **85**, 1514-1516 (2004).
111. P. Finkel, B. Seaman, K. Harrell, J. D. Hettinger, and S. E. Lofland, A. Ganguly, M. W. Barsoum, Z. Sun, S. Li and R. Ahuja, “Low Temperature Elastic, Electronic and Transport Properties of  $Ti_3Si_{1-x}Ge_xC_2$  Solid Solutions”, *Phys. Rev. B*, **70**, 085104 (2004).
110. M. W. Barsoum, A. Murugaiah, S. R. Kalidindi and T. Zhen, “Kinking Nonlinear Elastic Solids, Nanoindentations and Geology”, *Phys. Rev. Lett.*, **92**, 255508 (4pp) (2004).
109. A. Murugaiah, A. Souchet, T. El-Raghy, M. Radovic and M. W. Barsoum, “Tape Casting, Pressureless Sintering and Grain Growth in  $Ti_3SiC_2$  Compacts”, *J. Amer. Cer. Soc.*, **87**, [4] 550-556 (2004).
108. A. Murugaiah, M. W. Barsoum, S. Kalidindi and T. Zhen, “Spherical Nanoindentations in  $Ti_3SiC_2$ ”, *J. Mater. Res.*, **19**, 1139-1148 (2004).
107. S. Gupta and M. W. Barsoum, “Synthesis and Oxidation of  $V_2AlC$  and  $(Ti_{0.5}V_{0.5})_2AlC$  in Air”, *J. Electrochem. Soc.*, **151**, D24-D29 (2004).
106. M. W. Barsoum, A. Murugaiah, S. R. Kalidindi and Y. Gogotsi, “Kink Bands, Nonlinear Elasticity and Nanoindentations in Graphite”, *Carbon*, **42**, 1435-1445 (2004).
105. S. E. Lofland, J. D. Hettinger, K. Harrell, P. Finkel, S. Gupta, M. W. Barsoum & G. Hug “Elastic and Electronic Properties of Select  $M_2AX$  Phases”, *Appl. Phys. Letts.*, **84**, 508-510 (2004).
104. M. K. Drulis, A. Czopnik, H. Drulis and M. W. Barsoum, “Low Temperature Heat Capacity and Magnetic Susceptibility of  $Ti_3SiC_2$ ”, *J. Appl. Phys.*, **95**, 1128-1333 (2004).
103. A. Ganguly, T. Zhen & M. W. Barsoum, “Synthesis and Mechanical Properties of  $Ti_3(Si_xGe_{1-x})C_2$  ( $x = 0, 0.25, 0.5$ ) Solid Solutions”, *J. Alloys Compnds.*, **376**, 287–295 (2004).



102. B. Manoun, S. K. Saxena, R. Gulve, H. P. Liermann, A. Ganguly, M. W. Barsoum and C. S. Zha, "Compression of  $\text{Ti}_3\text{Si}_{0.5}\text{Ge}_{0.5}\text{C}_2$  to 53 GPa", Appl. Phys. Lettr., **84**, 2799-2801 (2004).

### 2003

101. S. Chakraborty, T. El-Raghy and M. W. Barsoum, "Oxidation of  $\text{Hf}_2\text{SnC}$  and  $\text{Nb}_2\text{SnC}$  in Air in the 400-600°C Temperature Range", Oxid. Metals, **59**, 83-96 (2003).
100. I. J. Jordan, T. Sekine, T. Kobayashi, X. Li, N. N. Thadhani, T. El-Raghy and M. W. Barsoum, "High Pressure Behavior of Titanium-Silicon Carbide,  $\text{Ti}_3\text{SiC}_2$ ", J. Appl. Phys., **93**, 9639-43 (2003)
99. Y. Gogotsi, A. Nikitin, H. Ye, W. Zhou, J. Fischer, B. Yi, H. Foley and M. W. Barsoum, "Nanoporous Carbide Derived Carbon with Tunable Pore Size", Nature Materials, **2**, 591-594 (2003).
98. S. E. Stolt, H. I. Starnberg and M. W. Barsoum, "Core Level and Valence Band Studies of Layered  $\text{Ti}_3\text{SiC}_2$  by High Resolution Photoelectron Spectroscopy", J. Phys. Chem. Solids, **64** 2321–2328, (2003).
97. M. Radovic, M. W. Barsoum, T. El-Raghy and S. Wiederhorn, "Tensile Creep of Coarse-Grained (100-300  $\mu\text{m}$ )  $\text{Ti}_3\text{SiC}_2$  in the 1000-1200 °C Temperature Range", J. Alloys Compnds., **361**, 299-312 (2003).
96. P. Finkel, M. W. Barsoum, J. D. Hettinger, S. E. Lofland and H.-I. Yoo, "Low Temperature Transport Properties of the Natural Nanolaminates:  $\text{Ti}_3\text{AlC}_2$  and  $\text{Ti}_4\text{AlN}_3$ ". Phys. Rev. B., **67**, 235108 (2003).
95. J. Travaglini, M. W. Barsoum, V. Jovic and T. El-Raghy, "The Corrosion Behavior of  $\text{Ti}_3\text{SiC}_2$  in Common Acids and NaOH", Corr. Sci., **45**, 1313-1327 (2003).
94. B. J. Kooi, R. J. Poppen, N. J. M. Carvalho, J. Th. M. De Hosson and M. W. Barsoum, " $\text{Ti}_3\text{SiC}_2$ : a Damage Tolerant Ceramic Studied with Nano-indentations and Transmission Electron Microscopy", Acta Mater., **51**, 2859-2872 (2003).
93. M. W. Barsoum, L. H. Ho-Duc, M. Radovic & T. El-Raghy, "Long Time Oxidation Study of  $\text{Ti}_3\text{SiC}_2$ ,  $\text{Ti}_3\text{SiC}_2/\text{SiC}$  and  $\text{Ti}_3\text{SiC}_2/\text{TiC}$  Composites in Air", J. Electrochem. Soc., **150**. B166-175 (2003).
92. I. Salama, T. El-Raghy and M. W. Barsoum, "Oxidation of  $\text{Nb}_2\text{AlC}$  and  $(\text{Ti,Nb})_2\text{AlC}$  in Air", J. Electrochem. Soc. **150**, C152-158 (2003).
91. M. W. Barsoum, T. Zhen, S. Kalidindi, M. Radovic and A. Murugaiah, "Fully Reversible, Dislocation-Based Compressive Deformation of  $\text{Ti}_3\text{SiC}_2$  up to 1 GPa", Nature Materials, **2**, 107-111 (2003).
90. L. H. Ho-Duc, T. El-Raghy and M. W. Barsoum, "Synthesis and Mechanical Properties of  $\text{Ti}_3\text{SiC}_2/\text{SiC}$  and  $\text{Ti}_3\text{SiC}_2/\text{TiC}$  Composites", J. Alloys Compnds., **350**, 303-312 (2003).

### 2002

89. M. W. Barsoum, A. Crossley and S. Myhra, "Crystal-Chemistry from XPS Analysis of Carbide-derived  $\text{M}_{n+1}\text{AX}_n$  ( $n = 1$ ) Nanolaminate Compounds", J. Phys. Chem. Solids. **63**, 2063-2068 (2002).
88. I. Salama, T. El-Raghy and M. W. Barsoum, "Synthesis and Mechanical Properties of  $\text{Nb}_2\text{AlC}$  and  $(\text{Ti,Nb})_2\text{AlC}$ ", J. Alloys Compnds. **347**, 271-278 (2002).
87. M. W. Barsoum, I. Salama, T. El-Raghy, J. Golczewski, W. D. Porter, H. Wang, H. Seifert and F. Aldinger, "Thermal and Electrical Properties of  $\text{Nb}_2\text{AlC}$ ,  $(\text{Ti,Nb})_2\text{AlC}$  and  $\text{Ti}_2\text{AlC}$ ", Met. Mater. Trans., **33A**, 2775-2779 (2002).

86. M. W. Barsoum, A. Ganguly, H. Seifert and F. Aldinger, "The 1300 °C Isothermal Section in the Nb-Sn-C Ternary Phase Diagram", *J. Alloys Compds.* **337**, 202-207 (2002).
85. M. W. Barsoum, J. Golczewski, H. Seifert and F. Aldinger "Fabrication, Electric and Thermal Properties of Ti<sub>2</sub>InC, Hf<sub>2</sub>InC and (Ti,Hf)<sub>2</sub>InC", *J. Alloy Compds.*, **340**, 173-179 (2002).
84. M. Radovic, M. W. Barsoum, T. El-Raghy, S. Wiederhorn and W. Luecke, "Effect of Temperature, Strain Rate and Grain Size on the Mechanical Response of Ti<sub>3</sub>SiC<sub>2</sub> in Tension", *Acta Mater.*, **50**, 1297-1306 (2002).
83. P. Finkel, J. Hettinger, S. E. Lofland, M. W. Barsoum and T. El-Raghy, "Magnetotransport Properties of the Ternary Carbide, Ti<sub>3</sub>SiC<sub>2</sub>: Hall Effect, Magnetoresistance & Magnetic Susceptibility of Ti<sub>3</sub>SiC<sub>2</sub> in the 4-300 K Range", *Phys. Rev. B*, **65**, 035113 (2002).

### 2001

82. D. Chen, K. Shirato, M. W. Barsoum, T. El-Raghy & R. O. Ritchie, "High-Temperature Cyclic Fatigue-Crack Growth in Monolithic Ti<sub>3</sub>SiC<sub>2</sub> Ceramics", *J. Amer. Cer. Soc.*, **84**, 2914 (2001).
81. M. Radovic, M. W. Barsoum, T. El-Raghy and S. Wiederhorn, "Tensile Creep of Fine-Grained (3-5 μm) Ti<sub>3</sub>SiC<sub>2</sub> in the 1000-1200 °C Temperature Range", *Acta Mater.*, **49**, 4103-4112 (2001).
80. M. W. Barsoum, N. Tzenov, A. Procopio, T. El-Raghy & M. Ali, "Oxidation of Ti<sub>n+1</sub>AlX<sub>n</sub> where n = 1-3 and X is C, N, Part II: Experimental Results", *J. Electrochem. Soc.*, **148**, (8) C551-C562 (2001).
79. M. W. Barsoum, "Oxidation of Ti<sub>n+1</sub>AlX<sub>n</sub> where n = 1-3 and X is C, N, Part I: Model", *J. Electrochem. Soc.*, **148**, (8) C544-C550 (2001).
78. M. W. Barsoum, M. Radovic, P. Finkel and T. El-Raghy, "Ti<sub>3</sub>SiC<sub>2</sub> and Ice", *Appl. Phys. Lett.*, **79**, 479-481 (2001).
77. T. El-Raghy, M. W. Barsoum and M. Sika, "Reaction of Al with Ti<sub>3</sub>SiC<sub>2</sub> in the 800–1000 °C Temperature Range", *Mater Sci. Eng. A*, **298**, 174-178 (2001).
76. S. Myhra, J. A. A. Crossley and M. W. Barsoum, "Crystal-Chemistry of the Ti<sub>3</sub>AlC<sub>2</sub> and Ti<sub>4</sub>AlN<sub>3</sub> Layered Carbide/Nitride Phases-Characterization by XPS", *J. Phys. Chem. Solids*, **62**, 811-817 (2001).
75. Y. Kuroda, I. M. Low, M. W. Barsoum and T. El-Raghy, "Indentation Responses and Damage Characteristics of Hot Isostatically Pressed Ti<sub>3</sub>SiC<sub>2</sub>", *J. Aust. Ceram. Soc.*, **37**, 95-102 (2001).

### 2000

74. P. Finkel, M. W. Barsoum, T. El-Raghy, "Low Temperature Dependencies of the Elastic Properties of Ti<sub>3</sub>Al<sub>1.1</sub>C<sub>1.8</sub>, Ti<sub>4</sub>AlN<sub>3</sub> and Ti<sub>3</sub>SiC<sub>2</sub>", *J. Appl. Phys.* **87**, 1701-3 (2000).
73. M. W. Barsoum, H.-I. Yoo, I. K. Polushina, V. Yu. Rud', Yu. V. Rud' and T. El-Raghy, "Electrical Conductivity, Thermopower and Hall effect of Ti<sub>3</sub>AlC<sub>2</sub>, Ti<sub>4</sub>AlN<sub>3</sub> and Ti<sub>3</sub>SiC<sub>2</sub>", *Phys. Rev. B.*, **52**, 10194-10198 (2000).
72. M. W. Barsoum, T. El-Raghy, W. D. Porter, H. Wang, J. C. Ho and S. Chakraborty, "Thermal Properties of Nb<sub>2</sub>SnC", *J. Appl. Phys.*, **88**, 6316 (2000).
71. T. El-Raghy, S. Chakraborty and M. W. Barsoum, "Synthesis and Characterization of Hf<sub>2</sub>PbC, Zr<sub>2</sub>PbC and M<sub>2</sub>SnC (M = Ti, Hf, Nb or Zr)", *J. Europ. Cer. Soc.*, **20**, 2619-2625 (2000).
70. M. W. Barsoum, C. J. Rawn, T. El-Raghy, A. Procopio, W. D. Porter, H. Wang, and C. R. Hubbard, "Thermal Properties of Ti<sub>4</sub>AlN<sub>3</sub>", *J. Appl. Phys.*, **87**, 8407-14 (2000).
69. C. J. Rawn, M. W. Barsoum, T. El-Raghy, A. Procopio & C. M. Hoffmann, "Structure of Ti<sub>4</sub>AlN<sub>3-x</sub>", *Mater. Res. Bulletin*, **35**, 1785-1796 (2000).

68. H.-I. Yoo, M. W. Barsoum and T. El-Raghy, “**Ti<sub>3</sub>SiC<sub>2</sub>: A Material With Negligible Thermopower Over an Extended Temperature Range**”, Nature, **407**, 581-582 (2000).
67. C. J. Rawn, E. A. Payzant, C. R. Hubbard, M. W. Barsoum and T. El-Raghy, “Structure of Ti<sub>3</sub>SiC<sub>2</sub>”, European Powder Diffraction, **321-3**: 889-892, Parts 1& 2 (2000).
66. C. J. Gilbert, D. R. Bloyer, M. W. Barsoum, T. El-Raghy, A. P. Tomsia, and R. O. Ritchie, “Fatigue-Crack Growth and Fracture Properties of Coarse and Fine-Grained Ti<sub>3</sub>SiC<sub>2</sub>”, Scripta Mater. **42**, 761-767 (2000).
65. M. Y. Gamarnik, M. W. Barsoum and T. El-Raghy, “Improved X-ray Powder Diffraction Data for Ti<sub>2</sub>AlN”, Powder Diffraction, **15**, (4) 241-242 (2000).
64. T. El-Raghy, P. Blau and M. W. Barsoum, “Effect of Grain Size on Friction and Wear Behavior of Ti<sub>3</sub>SiC<sub>2</sub>”, Wear, **238**, 125-130 (2000).
63. M. W. Barsoum, M. Ali and T. El-Raghy, “Processing and Characterization of Ti<sub>2</sub>AlC, Ti<sub>2</sub>AlN and Ti<sub>2</sub>AlC<sub>0.5</sub>N<sub>0.5</sub>”, Met. Mater. Trans., **31A**, 1857-65 (2000).
62. N. Tzenov and M. W. Barsoum, “Synthesis and Characterization of Ti<sub>3</sub>AlC<sub>1.8</sub>”, J. Amer. Cer. Soc., **83**, 825-832 (2000).
61. N. Tzenov, M. W. Barsoum and T. El-Raghy, “Influence of Small Amounts of Fe, V and Cu on the Synthesis and Stability of Ti<sub>3</sub>SiC<sub>2</sub>”, J. Europ. Cer. Soc. **20**, 801-806 (2000).
60. M. Radovic, M. W. Barsoum, T. El-Raghy, J. Seidensticker and S. Wiederhorn, “Tensile Properties of Ti<sub>3</sub>SiC<sub>2</sub> in the 25-1300 °C Temperature Range”, Acta Mater. **48**, 453-459 (2000).
59. A. T. Procopio, M. W. Barsoum and T. El-Raghy, “Characterization of Ti<sub>4</sub>AlN<sub>3</sub>”, Met. Mater. Trans. **31A**, 333 (2000).
58. A. T. Procopio, T. El-Raghy and M. W. Barsoum, “Synthesis of Ti<sub>4</sub>AlN<sub>3</sub> and Phase Equilibria in the Ti-Al-N System”, Met. Mater. Trans., **31A**, 373 (2000).

#### 1999

57. L. Farber, I. Levin, M. W. Barsoum, T. El-Raghy and T. Tzenov, "High-Resolution Transmission Electron Microscopy of Some Ti<sub>n+1</sub>AX<sub>n</sub> Compounds", J. Appl. Phys., **86**, 2540-2543, (1999).
56. M. W. Barsoum, L. Farber, I. Levin, A. Procopio, T. El-Raghy and A. Berner, “HRTEM of Ti<sub>4</sub>AlN<sub>3</sub>; or Ti<sub>3</sub>Al<sub>2</sub>N<sub>2</sub> Revisited”, J. Amer. Cer. Soc., **82**, 2545-2547 (1999).
55. M. W. Barsoum, T. El-Raghy, L. Farber, M. Amer, R. Christini and A. Adams, “The Topotaxial Transformation of Ti<sub>3</sub>SiC<sub>2</sub> To Form a Partially Ordered Cubic TiC<sub>0.67</sub> Phase by the Diffusion of Si into Molten Cryolite”, J. Electrochem. Soc., **146**, 3919-3923 (1999).
54. J. C. Ho, H. H. Hamdeh, M. W. Barsoum and T. El-Raghy, “Low Temperature Heat Capacities of Ti<sub>3</sub>Al<sub>1.1</sub>C<sub>1.8</sub>, Ti<sub>4</sub>AlN<sub>3</sub> and Ti<sub>3</sub>SiC<sub>2</sub>”, J. Appl. Phys., **86**, 3609-3611 (1999).
53. T. El-Raghy and M. W. Barsoum, “Growing Metallic Whiskers: An Alternative Interpretation”, Science, **284**, 1355 (1999).
52. L. Farber and M. W. Barsoum, "Isothermal Sections in the Cr-Ga-N System in the 650-1000 °C Temperature Range", J. Mater. Res., **14**, 2560-2566 (1999).
51. M. W. Barsoum and L. Farber, “**Room Temperature De-Intercalation and Self-Extrusion of Ga from Cr<sub>2</sub>GaN**”, Science, **284**, 937-939 (1999).
50. J. C. Ho, H. H. Hamdeh, M. W. Barsoum and T. El-Raghy, “Low Temperature Heat Capacity of Ti<sub>3</sub>SiC<sub>2</sub>”, J. Appl. Phys., **85**, 7970-7971 (1999).

49. P. Finkel, M. W. Barsoum and T. El-Raghy, "Temperature Dependence of Elastic Properties of  $Ti_3SiC_2$ ", J. Appl. Phys., **85**, 7123-7126 (1999).
48. M. W. Barsoum, L. Farber, T. El-Raghy and I. Levin, "Dislocations, Kink Bands and Room Temperature Plasticity of  $Ti_3SiC_2$ ", Met. Mater. Trans., **30A**, 1727-1738 (1999).
47. T. El-Raghy, M. W. Barsoum, A. Zavaliangos and S. Kalidindi, "Processing and Mechanical Properties of  $Ti_3SiC_2$ , Part II: Mechanical Properties", J. Amer. Cer. Soc., **82**, 2855-2859 (1999).
46. T. El-Raghy & M. W. Barsoum, "Processing and Mechanical Properties of  $Ti_3SiC_2$ : Part I: Reaction Path and Microstructure Evolution", J. Amer. Cer. Soc., **82**, 2849-54 (1999).
45. S. M. El-Raghy, A. F. Waheed, T. S. El-Raghy and M. W. Barsoum, "Preliminary Report on the Electrochemical Behavior of  $Ti_3SiC_2$ ", J. Mat. Sci. Lett., **18**, 519-520 (1999).
44. D. Brodtkin, A. Zavaliangos, S. Kalidindi and M. W. Barsoum, "Room and High Temperature Properties of Titanium Carbide-Titanium Boride Composites Fabricated by Transient Plastic Phase Processing", J. Amer. Cer. Soc., **82**, 665-72 (1999).
43. L. Farber, I. Levin and M. W. Barsoum, "HRTEM Study of a Low-Angle Boundary in Plastically Deformed  $Ti_3SiC_2$ ", Phil. Mag. Letters, **79**, 163 (1999).
42. M. Gamarnik and M. W. Barsoum, "Bond Lengths in the Ternary Compounds  $Ti_3SiC_2$ ,  $Ti_3GeC_2$  and  $Ti_2GeC$ ", J. Mater. Science, **34**, 169-174 (1999).
41. M. W. Barsoum, T. El-Raghy, C. J. Rawn, W. D. Porter, H. Wang, A. Payzant and C. Hubbard, "Thermal Properties of  $Ti_3SiC_2$ ", J. Phys. Chem. Solids, **60**, 429-439, (1999).
40. M. W. Barsoum and T. El-Raghy, "Room Temperature Ductile Carbides", Met. Mater. Trans., **30A**, 363-369 (1999).

#### 1998

39. M. Amer, M. W. Barsoum, T. El-Raghy, I. Wiess, S. LeClair and D. Liptak, "Raman Spectrum of  $Ti_3SiC_2$ ", J. Appl. Phys., **84**, 5817-5819 (1998).
38. E. H. Kisi, J. A. Crossley, S. Myhra and M. W. Barsoum, "Structure and Crystal-Chemistry of  $Ti_3SiC_2$ ", J. Phys. Chem. Solids, **59**, 1437-1443 (1998).
37. L. Farber, M. W. Barsoum, A. Zavaliangos, T. El-Raghy and I. Levin, "Dislocations and Stacking Faults in  $Ti_3SiC_2$ ", J. Amer. Cer. Soc., **81**, 1677-81 (1998).
36. M. W. Barsoum and J. C. Schuster, "Comment on 'New Ternary Nitride in the Ti-Al-N System'", J. Amer. Cer. Soc., **81**, 785-86 (1998).
35. I. M. Low, S. K. Lee, B. Lawn and M. W. Barsoum, "Contact Damage Accumulation in  $Ti_3SiC_2$ ", J. Amer. Cer. Soc., **81**, 225-28 (1998).
34. T. El-Raghy and M. W. Barsoum, "Diffusion Kinetics of the Carburization and Silicidation of  $Ti_3SiC_2$ ", J. Appl. Phys., **83**, 112-19, (1998).

#### 1997

33. H. J. Schluter, M. W. Barsoum and J. Maier, "Kinetic Studies of Oxygen Incorporation in  $SrTiO_3$  by Permeation Experiments", Solid State Ionics, **101**, 509-515, Part I, (1997).
32. M. W. Barsoum, G. Yaroshuck and S. Tyagi, "Fabrication and Characterization of  $M_2SnC$  (M = Ti, Zr, Hf and Nb)", Scrip. Mater., **37**, 1583-1591 (1997).
31. M. W. Barsoum and T. El-Raghy, "A Progress Report on  $Ti_3SiC_2$ ,  $Ti_3GeC_2$  and the H-Phases,  $M_2BX$ ", J. Mater. Synthesis Processing, **5**, 197-216 (1997).

30. M. W. Barsoum, T. El-Raghy and L. Ogbuji, "Oxidation of  $Ti_3SiC_2$  in Air", J. Electrochem. Soc., **144**, 2508-2516 (1997).
29. T. El-Raghy, A. Zavaliangos, M. W. Barsoum and S. Kalidindi, "Damage Mechanisms Around Hardness Indentations in  $Ti_3SiC_2$ ", J. Amer. Cer. Soc., **80**, 513-516, (1997).
28. M. W. Barsoum, D. Brodtkin and T. El-Raghy, "Layered Machinable Ceramics For High Temperature Applications", Scrip. Mater., **36**, 535-541, (1997).

#### 1996

27. A. Elkind and M. W. Barsoum, "Strength Degradation of SiC Monofilaments as Result of Grain Growth at High Temperatures", J. Mater. Sci., **31**, 6119-6123 (1996).
26. M. W. Barsoum and T. El-Raghy, "Synthesis and Characterization of a Remarkable Ceramic:  $Ti_3SiC_2$ ", J. Amer. Cer. Soc., **79**, 1953-56 (1996). **With > 1000 citations this paper is the most cited paper in the J. Amer. Cer. Soc. since 1996.**
25. D. Brodtkin, S. Kalidindi, M. W. Barsoum and A. Zavaliangos, "Microstructural Evolution During Transient Plastic Phase Processing of Titanium Carbide-Titanium Boride Composites", J. Amer. Cer. Soc., **79**, 1945-52 (1996).
24. D. Brodtkin and M. W. Barsoum, "Isothermal Section of the Ti-B-C Phase Diagram at 1600 °C", J. Amer. Cer. Soc., **79**, 785-87 (1996).
23. M. W. Barsoum, A. Elkind and F. Selim, "Low Breakdown Voltage Varistors by Grain Boundary Diffusion of Molten  $Bi_2O_3$  in ZnO", J. Amer. Cer. Soc., **79**, 962-66 (1996).

#### 1978-1995

22. M. W. Barsoum and A. Elkind, "Effect of Viscous Flow on Thermal Residual Stresses in SiC Borosilicate Composites", J. Mater. Sci., **30**, 69-74 (1995).
21. M. W. Barsoum & B. Houg, "Transient Plastic Phase Processing of Ti-B-C Composites", J. Amer. Cer. Soc., **76**, 1445-51 (1993).
20. A. Elkind, M. W. Barsoum and P. Kangutkar, "Thermal Expansion of SiC Monofilaments and SiC Borosilicate Composites", J. Amer. Cer. Soc., **75**, 2871-73 (1992).
19. M. W. Barsoum, I.-C. Tung and H. M. Chou, "Effect of Oxidation on Single-Fiber Pullout Interfacial Shear Stresses in the SiC-Borosilicate Glass System", J. Amer. Cer. Soc., **74**, 2693-96 (1991).
18. A. S. D. Wang, X. G. Huang and M. W. Barsoum, "Matrix Crack Initiation in Ceramic Matrix Composites; Part II. Models and Simulation Results", *ibid.* pp. 271-282.
17. M. W. Barsoum, P. Kangutkar and A. S. D. Wang, "Matrix Crack Initiation in Ceramic Matrix Composites; Part I. Experimental and Test Results", Comp. Sci. and Techn., **44**, 257-270 (1992).
16. M. W. Barsoum, P. Kangutkar and M.J. Koczak, "Nitridation Kinetics and Thermodynamics of Silicon Powder Compacts", J. Amer. Cer. Soc., **74**, 1248-1253 (1991).
15. J. Chou, M. W. Barsoum and M.J. Koczak, "Effect of Temperature on Interface Bonding of SiC-Glass Single-Fiber Specimens", J. Mater. Sci., **26**, 1216-1222 (1991).
14. H. D. Merchant, J.G. Morris and M. W. Barsoum, "Strain Age Strengthening of Aluminum Alloys", Aluminum, **67**, 275-281 (1991).
13. M. W. Barsoum, "Critical Review of the Thermodynamics of the Na-Al-O System", J. Mater. Scien, **25**, 4393-4400, (1990).



12. A. Nath, S. Nagy, M. W. Barsoum, S. Tyagi and Y. Wen, "A Microprobe for the Cu(1) Site in  $Y_1Ba_2Cu_3O_y$ : Emission Mossbauer Studies Using Carrier-Free Cobalt-57", Solid State Comm., **68**, 181-184, (1988).
11. S. Tyagi and M. W. Barsoum, "Low -Field Microwave Absorption in YBaCu0 - a Possible Device Application", Supercond. Sci. Technol. **1**, 20-23, (1988).
10. S. Tyagi, M. W. Barsoum, K.V. Rao & N. Karpe, "Non-Resonant Microwave Absorption: A Microprobe to Superconductivity in  $Y_1Ba_2Cu_3O_{7-x}$ " J. de Physique, **C8-2229** (1988).
9. S. Tyagi, M. W. Barsoum and K.V. Rao, "Low-Field Microwave Absorption and Flux Quantization in  $Y_1Ba_2Cu_3O_y$ ", J. Phys. C: Solid State Phys. **21**, L827-L833, (1988).
8. S. Tyagi, M. W. Barsoum, K.V. Rao and V. Skumryev, "Low Field ac-Susceptibility and Micro-wave Absorption in YBaCu0 and BiCaSrCu0 Superconductors", Physica C, **156**, 73 (1988).
7. S. Tyagi, M. Barsoum & K.V. Rao, "Electron Spin Resonance in  $Y_1Ba_2Cu_3O_y$ ", Phys. Letters A. **128**, 225-227 (1988).
6. M. W. Barsoum and O. Zhou, "Microcracking in Ceramic/Ceramic Composites", Adv. Ceram. Mater., **3**, 361-68 (1988).
5. M. W. Barsoum, D. Patten and S. Tyagi, "The Use of the Meissner Effect to Separate, Purify and Classify Superconducting Powders", App. Phys. Lett., **51**, pp. 1954-56, (1987).
4. M. W. Barsoum and H. L. Tuller, "Thermodynamics of Molten Li-Sn Alloys", Met. Trans. A, **19A**, pp. 637-644, (1988).
3. M. W. Barsoum and H. Tuller, "In-Situ Determination of the Kinetics of Reaction between Li & Fast-Ion Conducting Lithium Borate Glasses", Solid State Ionics, **18 &19**, 338 (1986).
2. H. L. Tuller and M. W. Barsoum, "Glass Solid Electrolytes-Past, Present and Near Future", J. Non-Cryst. Solids, **Invited Paper**, **73**, 331-350 (1985).
1. M. A. El Said, M.W. Barsoum, M. H. Ishaq and H. D. Merchant, "Effect of Sb, Sn and Pb on the Recrystallization of Bismuth", J. Less Comm. Metals, **58**, 133 (1978).

### **FULL TEXT CONFERENCE PAPERS**

1. M. W. Barsoum, M. Velez, H.L. Tuller and D. R. Uhlmann, "Reactions at Alkali Metal-Glass Interfaces", in Surfaces and Interfaces in Ceramic and Ceramic-Metal Systems. Eds. J. Pask and A. Evans, Plenum Publishing Co. (1981) p. 567.
2. M. W. Barsoum and P.D. Ownby, "The Effect of Oxygen Partial Pressure on the Wetting of SiC, AlN and  $Si_3N_4$  by Si and a Method to Calculate the Surface Energies Involved", *ibid*, p. 457.
3. H. L. Tuller and M. W. Barsoum, "Electrolytic Control and Detection of Ionic Species Using Fast-Ion Conducting Glasses", Proceedings of the Int. Conf. on Solid State Transducers, Philadelphia, PA, IEEE Press, 1985. Invited Paper, p. 256.
4. M. W. Barsoum, D. Patten and S. Tyagi, "Magnetic Separation of High Tc Powders", Ceramic Superconductors II, M. F. Yan, Ed. Amer. Cer. Soc.(1988).pp.554-562.
5. S. Nagy, M. W. Barsoum, S. Tyagi and A. Nath, "Emission Mossbauer Studies of  $Y_1Ba_2O_3O_{7-\square}$  Using Carrier Free Cobalt-57", Proc. First Asia-Pacific Conference on Condensed Matter Phys., 27 June- 3 July 1988, Singapore.
6. M. W. Barsoum, P. Kanguktar & M.J. Koczak, " Nitridation Mechanisms of Si Powder Compacts", Proceedings of the 13th Annual Conference on Composites and Advanced Ceramics, Amer. Cer. Soc., Coco Beach, Fl. Jan. 1989. pp. 794-806.



7. A. Wang, M. W. Barsoum & M.W. Huang, "Matrix Cracking Initiation in Brittle Matrix Composites: Experiment and Predictions", Proceed. Amer. Soc. for Composites Symposium on High Temperature Composites, Dayton, Ohio, June 13-15, 166-175 (1989).
8. M. W. Barsoum, B. Plotnick & A. Wang, "Matrix Cracking Stresses in Uniaxially Fiber Reinforced Ceramic Matrix Composites", Proceedings of 7th CIMTEC World Congress, Montecatini, Italy, June 1990.
9. M. W. Barsoum, J. Medoff, P. Kumar & R. Hard, "Calcination, Sintering and Transport Critical Currents of a Co-Precipitated  $Y_1Ba_2O_3O_{7-x}$  Powder", in High Temperature Superconductors, Ed. P. Vincenzini, Elsevier Science Pubs., pp. 673-680 (1991).
10. P. Kangutkar, M. W. Barsoum and A. Wang, "In Situ Observation of Damage Initiation and Evolution in Unidirectional Ceramic Matrix Composites", Proceedings of 1st Canadian International Composites Conference. Sept. 4-6, Montreal, 1991. pp. 594-600.
11. D. Brodtkin, M. W. Barsoum, A. Zavaliangos, and S. Kalidindi, "Cost Effective Fabrication of Ultra-refractory Ceramic-Ceramic Composites by Transient Plastic Phase Processing", Proc. of the 1995 NSF Design and Manufacturing Grantees Conf., SME, p. 519, 1995.
12. D. Brodtkin, M. W. Barsoum, A. Zavaliangos and S. Kalidindi, "Processing-Structure-Properties Relations in Titanium-Boron-Carbon Ceramic Composites Produced by Transient Plastic Phase Processing", Cer. Eng. & Sci. Proc., July 1994.
13. D. Brodtkin, M. W. Barsoum, A. Zavaliangos and S. Kalidindi, "Processing-Structure-Property Relations in Ceramic-Ceramic Composites Manufactured by Transient Plastic Phase Processing", Ceramic Engineering and Science Proc., **15**, pp. 121-130, 1994.
14. D. Brodtkin, A. Zavaliangos, S. Kalidindi and M. W. Barsoum, "Transient Plastic Phase Processing Of Titanium Carbide-Titanium Boride Composites: Reaction Paths And Microstructural Evolution", Proceedings, 9th Technical Conference on Composite Materials, pp. 55-62, University of Delaware, September 1994.
15. D. Brodtkin, S. Kalidindi, M. W. Barsoum & A. Zavaliangos, "Reaction Paths and Micro-Structural Evolution During Transient Plastic Phase Processing of Titanium Carbide-Titanium Boride Composites", Proc. of TMS Winter Meeting, Las Vegas, Feb. 1995. Eds. E. Barrera, F. Marquis, W. Frazier, S. Fishman, N. Thadani and Z. Munir, TMS, 13-24 Warrendale, 1995.
16. D. Brodtkin, A. Zavaliangos, S. Kalidindi & M. W. Barsoum, "Microstructural Optimization and Mechanical Properties of Titanium Carbide-Titanium Boride Composites Fabricated by Transient Plastic Phase Processing". Processing and Fabrication of Advanced Materials IV, T.S. Srivatsan and J.J. Moore (Eds.), pp. 189-198, TMS, Warrendale, PA 1996.
17. **(Invited Paper)** D. Brodtkin, A. Zavaliangos, S. Kalidindi & M. W. Barsoum, "Transient Plastic Phase Processing Of TiC-Titanium Boride Composites: Reaction Paths & Micro-structural Evolution", Proc. Inter. Conf. in Composites Engin., p. 585, New Orleans, 1994.
18. T. El-Raghy, A. Zavaliangos, M. W. Barsoum & S. Kalidindi, "Synthesis & Characterization of  $Ti_3SiC_2$  and  $Ti_3SiC_2/TiC/SiC$  Composites", Proc. of ASM Fall Meet., Cinn. OH, Oct. 1996.
19. M. W. Barsoum and T. El-Raghy, "Ternary Carbide of Titanium and Silicon", Advanced Materials and Processes, **152**, [7] 51-52, 1997.
20. C. J. Rawn, E. A. Payzant, C. R. Hubbard, M. W. Barsoum and T. El-Raghy, Structure of  $Ti_3SiC_2$ ", To appear in Materials Science Forum.
21. T. El-Raghy, M. Amer, M. W. Barsoum & I. Weiss, "Functionally Graded Joints for C/C Composites", 44<sup>th</sup> Int. SAMPE Symp. & Exhibition, Long Beach CA, May 1999.
22. C. J. Rawn, E.A. Payzant, C.R. Hubbard, M.W. Barsoum, and T. El-Raghy, "Structure of  $Ti_3SiC_2$ ", EPDIC-6 – Proc. 6th Europ. Powder Diffraction Conf. [R. Delhez & E.J. Mittemeijer, eds.], Materials Science Forum vol. 321-324, Trans Tech Pub., Zürich, Switzerland, pp. 889-892 (2000).
23. K. Shirato, D. Chen, M. W. Barsoum, T. El-Raghy and R. O. Ritchie, "High Temperature Cyclic Fatigue Crack Growth in Monolithic  $Ti_3SiC_2$  Ceramics", Proc. TMS Fall 2000.
24. Y. Kuroda, I. M. Low, B. H. O'Connor, M. W. Barsoum and T. El-Raghy, "Effect of grain size on the preferred grain orientations in  $Ti_3SiC_2$ ", pp. 1473-1476 in Proc. 2000 Powder Metallurgy World Congress (Eds. K. Kosuge & H. Nagai), Nov. 2000, Kyoto, Japan.

25. I. M. Low, M. Singh, P. Manurung, E. Wren, D. P. Sheppard, M.W. Barsoum, "Depth profiling of phase composition and texture in layered-graded Al<sub>2</sub>O<sub>3</sub>- & Ti<sub>3</sub>SiC<sub>2</sub>-based systems using X-ray and synchrotron radiation diffraction", HIGH-PERFORMANCE CERAMICS 2001, PROC. KEY ENGINEERING MATERIALS 224-2: 505-510, 2002.
26. A. Souchet, J. Fontaine, M. Belin, T. Le Mogne, J-L. Loubet and M. W. Barsoum, "Dual Tribological Behavior of a Nanolayered Ceramic: Ti<sub>3</sub>SiC<sub>2</sub>", Proceedings of Spring 2003 MRS, San Francisco, CA.
27. A. Kontsos, K. Hazeli, M. W. Barsoum, B. Anasori, T. Loutas, G. Sotiriadis and V. Kostopoulos' "Grain Size Effect on the Fatigue Response of Nanocrystalline Mg Composites Reinforced with MAX Phases", 9<sup>th</sup> HSTAM Intern. Cong. on Mechanics-Limassol, Cyprus, July 2010; Eds. P. Papanastasiou et al., pp 603-610.
28. P. Finkel, A. G. Zhou, S. Basu, O. Yeheskel & M. W. Barsoum, "On the Observation of Acoustic-Elastic Hysteresis in Kinking Non-linear Elastic Solids", AIP Conf. Proc. **1096**, pp. 231-237, 2009.
29. B. Anasori, S. Amini, V. Presser and M. W. Barsoum, "Nanocrystalline Mg-Matrix Composites with Ultrahigh Damping Properties", **Magnesium Tech. 2011**, Eds: W. H. Sillekens, S. R. Agnew, N. R. Neelameggham and S. N. Mathaudhu TMS, The Minerals, Metals & Materials Society, (2011) pp. 463-468.
30. B. Anasori and M. W. Barsoum: "On the Effect of Ti<sub>2</sub>AlC on the Fabrication of Extraordinary Thermally Stable Mg Nano Grains", **Magnesium Tech 2012**, John Wiley & Sons, Inc. New York.

## MONOGRAPHS

M. J. Koczak, K. Prewo, A. Mortensen, S. Fishman, M. W. Barsoum & R. Gottschall, "Inorganic Composite Materials in Japan: Status and Trends", ONR Research Scientific Bull., Nov. 1989.

## PRESENTATIONS

**Invited Talks:** (Highlighted talks are noteworthy).

226. **Plenary Lecture:** 10<sup>th</sup> Inter. Conf. on High Perform. Ceramics; Nanchang; China, Nov. 2017. Ripp.
225. **Plenary Lecture:** Long-Period Stacking Ordered Structure, Kyoto, Dec., 2016 Japan; Ripplocations.
224. North Carolina State Univ., Chapel Hill, NC; Nov. 2016; Ripplocations.
223. **Plenary Lecture:** Inter. Conf. Techn. Advan. Mater.(ICTAM), New Delhi, Nov. 2016. MAX/MXene
222. Texas A&M, College Station, TX, Sept. 2016; Ripplocations.
221. Texas A&M, College Station, TX, Sept. 2016; MAX/MXene.
220. American Chemical Soc., Annual Meeting, Philadelphia, Aug. 2016, MXene talk.
219. American Nuclear Soc., Annual Meeting, New Orleans, June 2016, MAX for Nuclear Applications
218. NSUF Users Meeting, Idaho Falls, June 2016, MAX for Nuclear Applications.
217. Tsinghua University, Beijing, China, May 2016, MAX/MXene.
216. Beijing Jiaotong Univ., Beijing, China, May 2016, MAX/MXene.
215. Institut Neel, CNRS, Grenoble, France, April 2016; MXene.
214. LMI/CNRS, Univ. Lyon 1, Lyon, France, March 2016. Pyramid talk.
213. LMI/CNRS, Univ. Lyon 1, Lyon, France, March 2016. MAX/MXene.
212. **MINATEC**, Institute Polytechnique de Grenoble, Grenoble, France, March 2016: Ripplocations.
211. TU Delft, Delft, Holland, March 2016: MAX/MXene.
210. SCK•CEN; Belgium, March 2016: MAX for Nuclear Applications.
209. KU-Leuven, Leuven, Belgium, March 2016: MAX/MXene.
208. Institute Polytechnique de Grenoble, Grenoble, France, Feb. 2016: MAX/MXene.
207. Varinor International SA, Delemont, Switzerland, Feb. 2016: MAX Phases.
206. RWTH Aachen, Aachen, Germany; Feb. 2016: MAX/MXene.
205. RWTH Aachen, Aachen, Germany; Feb. 2016: Pyramid talk.
204. Queens Mary University, London, December 2015: Pyramid talk.
203. Queens Mary University, London, December 2015; MAX/MXene.

202. Helmut Schmidt U., Hamburg, November 2015; MAX/MXene.
201. National Nuclear Laboratory, Preston, UK: November 2015: MAX for Nuclear Applications.
200. University of Padua, Padua, Italy, November 2015: MAX/MXene.
199. University of Padua, Padua, Italy, November 2015: Pyramid Talk.
198. Oxford University, Oxford, UK, October 2015: MAX/MXene.
197. Imperial College, London, UK, Fall 2015: A series of 5 lectures on the MAX phases.
196. Imperial College, London, UK, Oct. 2015: Pyramid Talk.
195. Cambridge University, Cambridge, UK, Oct. 2015: Rippllocations/Layered Solids
194. Cambridge University, Cambridge, UK, October 2015: MAX/MXene.
193. University of Manchester, Manchester, UK. October 2015: MAX for nuclear Appl.
192. Materials for Extreme Environments, Birmingham, UK, Oct. 2015: MAX for Nuclear Applications
191. University of Amsterdam, Holland, Sept. 2015: MAX/MXene.
190. 11<sup>th</sup> Inter. Conf. Ceram. Mater. Energy Environ. Appl., June 2015, Vancouver, BC, MAX/MXene.
189. WHYY Studios: Philadelphia Science Festival, April 2015, "Molding conductive 'clay' into the next generation of batteries".
188. TEDx Talk, Drexel University, Philad. PA. April 2015. "Money for Nothing, Discoveries for Free"
187. Florida International University, Miami, FL, April 2015: MAX/MXene.
186. Florida International University, April 2015: Pyramid talk.
185. German Physical Society Meeting, Berlin, Germany, March 2015: MAX/MXene.
184. 39<sup>th</sup> ICACC in Daytona Beach, FL, January 2015: MAX Phases for Nuclear Applications.
183. University of Tennessee, Knoxville, TN, Oct. 2014; Pyramid talk.
182. U. of Duisburg, Germany, Oct. 2014: From 3D to 2D.
181. Plenary Lecture; Long-Period Stacking Ordered Structure, Kumamoto, Oct. 2014 Japan; MAX/Mg
180. Plenary Lecture; 13<sup>th</sup> Intern. Ceram. Congress, Montecatini Terme, Italy; June 2014; 3D to 2D.
179. International Materials for Aerospace for Aeronautical Materials, Blida, June 2014 Algiers; MAX
178. U.S. Army Research Laboratory, Aberdeen Proving Grounds, May 2014; Pyramid talk
177. Microstructural Functionality: Dynamics, Adaption, and Self- Healing at the Nanoscale, Duisburg, Germany, April 2014; KNE.
176. Ningbo Institute of Maters. Tech. and Engin., Ningbo, China, Nov. 2013; Two talks on MAX phases
175. Plenary Lecture: 8<sup>th</sup> Inter. Conf. on High Performance Ceram.; Chungqing; China, Nov. 2013. MAX
174. Royal Swedish Academy of Engineering Sciences, Stockholm, Sweden, Oct. 2013. Future Materials - Impact on Society.
173. Oak Ridge National Lab, Oak Ridge, TN, August 2013, KNE/ND
172. United Technology Research Center, June 2013, Hartford, CT, MAX talk.
171. BATT Conference, Washington, DC, May 2013, MXene talk
170. U. of Puerto Rico, Puerto Rico, April 2013; MXene talk.
169. Linkoping University, Linkoping, Sweden, March 2013; MXene talk.
168. EMPA, Geisen, Switzerland, March 2013, MAX talk
167. NASA, Cleveland OH. Oct. 2012, MAX for high temperature applications.
166. Keynote Lecture: Long-Period Stacking Ordered Structure, Sapporo, Japan; Oct. 2012, MAX/KNE.
165. Picatinny Arsenal, NJ, Sept. 2012; MAX/Mg talk
164. Linkoping University, Linkoping, Sweden, May 2012, MXene talk.
163. Universite de Poitiers, Poitiers, France, Feb. 2011; MXene talk.
162. Keynote Lecture, Fray International Symposium, Nov. 2011, Cancun, Mexico
161. Universite de Poitiers, Poitiers, France, Oct. 2011; Pyramid talk.
160. MS&T'11 Fall Meeting, Columbus, OH, Oct. 2011; Nanoindentation talk.
159. MS&T'11 Fall Meeting, Columbus, OH, Oct. 2011; MAX-MET talk.
158. Rutgers University, New Brunswick, NJ, Oct. 2011; Pyramid talk.
157. Haldor Topsøe, Copenhagen, Denmark, March 2011; MAX phase talk
156. Society of Danish Chemical Engineers, Copenhagen, Denmark, March 2011; Pyramid talk
155. Linkoping University, Linkoping, Sweden, March 2011, MAX phase derivatives.
154. Loyola University, Baltimore, MD, Feb. 2011, Pyramid talk

153. General Electric, Schenectady, NY. December, 2010; MAX phase talk.
152. **Plenary Lecture**: 7<sup>th</sup> Inter. Conf. on High Temp. Ceram. Matrix Comp., Bayreuth, Germany, Sept. 2010. MAX phase talk.
151. Paul Scherrer Institute, Zurich, Switzerland, July 2010; MAX/KNE talk.
150. EMPA, Thun, Switzerland, July 2010; MAX/KNE/NI talk.
149. CIMTEC, Montecatini, Italy, June, 2010. MAX/KNE talk.
148. **Keynote Lecture**: 1<sup>st</sup> Intern. Conf. on Materials for Energy 2010, Karlsruhe, Germany, July 2010. MAX phase talk.
147. Harbin Institute of Technology, Harbin, China, May 2010; Mech. props. of MAX phases.
146. Harbin Institute of Technology, Harbin, China, May 2010; Physical props. of MAX phases.
145. ASM Brandywine Chapter, April 2010, Brandywine PA; Pyramid talk.
144. CAMTEC II, Cambridge, England, March 2010; NI/KNE talk.
143. 34<sup>th</sup> ICACC in Daytona Beach, FL, January 2010; MAX phase talk
142. 34<sup>th</sup> ICACC in Daytona Beach, FL, January 2010; Pyramid Talk
141. Science Café, Santa Fe Alliance for Science, Santa Fe, NM; January 2010, Pyramid talk.
140. Washington University, St. Louis, Mo, November, 2009; Pyramid talk.
139. Lake Louise Conference, Lake Louise, Canada, Oct. 2009; Pyramid talk
138. Lake Louise Conference, Lake Louise, Canada, Oct. 2009; MAX talk
137. TM&S Fall Meeting, Pittsburgh, PA, Oct. 2009; MAX talk.
136. Right Angle Club, Philadelphia, PA, Oct. 2009, Pyramid talk.
135. Florida Institute of Technology, Melbourne, FL, Oct. 2009, Pyramid talk.
134. MS&T'09 Fall Meeting, Pittsburgh, Oct. 2009, MAX talk.
133. RWTH Aachen, Aachen, Germany; Sept. 2009, MAX/KNE talk
132. Los Alamos National Lab, Los Alamos, NM, June 2009; Pyramid talk.
131. Amer. Cer. Soc. PACRIM8 Meeting, June 2009, Vancouver, Canada; Pyramid talk.
130. Uppsala Univ., Uppsala, Sweden, May 2009; MAX/KNE talk.
129. Uppsala University, Uppsala, Sweden, May 2009; Pyramid talk.
128. Inter. Conf. on Metall. Coating & Thin Films. San Diego, CA, April 2009; MAX/KNE talk.
127. Los Alamos National Lab, Los Alamos, NM, March 2009; Pyramid talk.
126. Los Alamos National Lab., Los Alamos, NM, Feb. 2009; Pyramid talk.
125. Linkoping University, Linkoping, November, Nov. 2008. Pyramid talk.
124. Linkoping University, Linkoping, November, Nov. 2008. MAX talk.
123. Anna Maria Workshop IX, Anna Maria Island, Nov. 2008. Pyramid talk.
122. Anna Maria Workshop IX, Anna Maria Island, Nov. 2008. Alternative cement talk.
121. MS&T, Pittsburgh, PA, Oct. 2008. Pyramid talk.
120. MS&T, Pittsburgh, PA, Oct. 2008. Spherical Nanoindentation Stress-Strain Curves, Kinking Nonlinear Elastic Solids and Low Dimensionality Solids.
119. E-MRS Fall Meeting, Warsaw, Poland, Sept. 2008. MAX/KNE talk.
118. Special Workshop: "Radiation Stability of Complex Microstructures"; Santa Fe, NM, Sept. 2008, Compression creep of ceramics and MAX phases.
117. Rutgers University, New Brunswick, NJ, Sept. 2008. Pyramid Talk
116. **Director's Colloquium**, Savannah River National Lab., Aiken, SC, May 2008; Pyramid Talk.
115. **Sigma Xi Lecture, MIT**, Cambridge, MA, May 2008; Pyramid talk.
114. NIST, Gaithersburg, MD. April 2008, Pyramid talk.
113. ASM Liberty Bell Chapter, Sustaining Members Night, April 2008; Pyramid talk.
112. Dupont Experimental Station, Delaware, March 2008; MAX/KNE talk.
111. 13<sup>th</sup> Israeli Materials Engineering Conference, December 2007; Pyramid talk.
110. **Plenary Lecture**, 13<sup>th</sup> Israeli Materials Engineering Conference, Dec. 2007; MAX/KNE talk.
109. MRS Fall 2007 Meeting, Boston, MA, Nov. 26-28, 2007, Symposium Y; Pyramid talk.
108. Center for Talented Youth, Johns Hopkins Univ., 2007 Science and Technology Series, Family Academic Programs, Oct. 2007. Pyramid Talk.

107. **Gordon Research Conf.**, High Temperature Corrosion; New London, NH; August 2007. MAX oxidation.
106. Los Alamos National Lab., Los Alamos, NM, April 2007; MAX talk.
105. Laval University, Quebec City, Canada, May 2007, Pyramid talk.
104. International Cement Microscopy Assoc. Conf., Quebec City, Canada, May 2007, Open debate on whether cast blocks were used in construction of the Pyramids of Egypt.
103. 6<sup>th</sup> Adv. Workshop on Engin. Ceram., Smolenice Castle, Slovakia, May 2007; KNE talk
102. 6<sup>th</sup> Adv. Workshop on Engin. Ceram., Smolenice Castle, Slovakia, May 2007; Pyramid talk
101. Los Alamos National Lab., Los Alamos, NM, April 2007; Nanoindentation talk.
100. Los Alamos National Lab., Los Alamos, NM, April 2007; KNE Talk
99. Los Alamos National Laboratory, Los Alamos, NM, April 2007; Pyramid Talk
98. Texas A&M, College Station, TX, March 2007; Pyramid talk
97. Texas A&M, College Station, TX, March 2007; Kinking Nonlinear Elastic Solids talk.
96. International Center of Diffraction Data, Newtown Square, PA March 2007; Pyramid talk.
95. **Keynote speaker**, National Consortium of Specialized Secondary Schools of Math, Science, and Technology, Drexel University, March 2007. Pyramid Talk.
94. Johns Hopkins University, Baltimore, MD, March 2007. Kinking Nonlin. Elastic Solids Talk
93. Drexel University, Engineering New Frontiers Lecture, February 2007. Pyramid Talk
92. Columbia University, Geology Department, New York, January 2007. Pyramid Talk
91. MS&T Fall 2006 Meeting, Cincinnati, OH (two different invited talks).
90. Frontiers in Materials Research Workshop, Center for Advanced Interdisciplinary Research, Vina del Mar, Chile, Oct. 2006.
89. University of Gottingen, Gottingen, Germany, July 2006.
88. CIMTEC, Italy, June 2006.
87. Oak Ridge National Laboratory, Oak Ridge, TN, April 21, 2006. Pyramid Talk.
86. Oak Ridge National Laboratory, Oak Ridge, TN, April 19, 2006.
85. Drexel University, Department of Materials Science and Engineering, April 2006.
84. CEA, Saclay, France, March 2006.
83. AVS International Symposium, Boston, USA, October 30th to November 4th, 2005.
82. ONERA, Paris, September 2005.
81. SMEC Conf., Florida International University, Miami, FL, April 2005.
80. Caterpillar, Technology & Solutions Division, Peoria, IL, January 2005
79. 29th Annual Cocoa Beach Meeting, Jan. 23-28, 2005, Cocoa Beach, FL
78. NIST, Gaithersburg, MD, December 2004.
77. IBM, Poughkeepsie, New York, December 2004.
76. DOE Workshop on Ceramics Ductilization, Santa Fe, NM, November 2004.
75. Aberdeen Proving Grounds, ARL, Aberdeen, MD, October 2004.
74. CNRS/Ecole Centrale de Lyon, Lyon, France, September 18, 2004.
73. CNRS/Ecole Centrale de Lyon, Lyon, France, September 16, 2004.
72. University of Grenoble, Grenoble, France, September 14, 2004.
71. Polish Academy of Sciences, Wroclaw, Poland, May 2004.
70. Uppsala University, Uppsala, Sweden, May 2004, MAX phases
69. Virginia Tech. University, Blacksburg, VA, March 2004, MAX phases.
68. Seoul National University, Seoul, S. Korea, Oct. 2003.
67. 1<sup>st</sup> International Symposium on Nanostructured Materials, Seoul, S. Korea, Oct. 2003.
66. University of Poitiers, Poitiers, France, July 2003, MAX phases
65. Rutgers University, New Brunswick, March 2003, MAX phases
64. Oak Ridge National Laboratory, Oak Ridge, TN, Feb. 2003. MAX phases.
63. ONERA, Paris, France, June 2002. MAX phases.
62. University of Poitiers, Poitiers, France, June 2002. MAX phases.
61. CNRS/Ecole Centrale de Lyon, Lyon, France, June, 2002.
60. GE Aircraft Engines, Cincinnati, OH May 2002.



59. University of Missouri-Rolla, Rolla, MO, April. 2002.
58. AIST, Sendai, Japan, March 2002. MAX phases.
57. Tohoku University, Sendai, Japan, March 2002. MAX phases.
56. Cerratec Inc., Sendai, Japan, March, 2002. MAX phases.
55. Drexel University, Phila., PA, Feb. 2002. MAX phases.
54. U. of Pennsylvania, Phila. PA. Oct. 2001. MAX phases.
53. U. of Maryland, College Park, MD, Sept. 2001, MAX phases.
52. Naval Research Lab., Wash. DC., Sept. 2001, MAX phases
51. Technische Univ. Clausthal, Clausthal, Germany, June 2001.
50. U. of Hamburg, Hamburg, Germany, June 2001.
49. U. of Ulm, Ulm, Germany, May 2001.
48. AEA Technology, Oxford, England, April 2001.
47. Uppsala Univ., Uppsala, Sweden, Workshop on Experimental and Theoretical Studies of Designer Materials, April 2001.
46. Oxford University, Oxford, England, April 2001.
45. U. of Karlsruhe, Karlsruhe, Germany, March 2001, MAX phases
44. Federal Instit. of Tech., Lausanne, Switzerland, Feb. 2001  
Technical Univ. of Eindhoven, Netherland, Feb. 2001
43. U. of Groningen, Holland, Feb. 2001
42. Max-Planck Institute, Stuttgart, Germany, Dec. 2000.
41. ABB Corp., Sweden, Dec. 2000.
40. Uppsala University, Sweden, Dec. 2000, MAX phases
39. Linkoping University, Sweden, Dec. 2000. MAX phases
38. Hilti Corp., Lichtenstein, Dec. 2000.
37. Chalmers University of Tech., Sweden, Dec. 2000, MAX phases
36. Kanthal Corp., Sweden, Dec. 2000, MAX phases
35. Univ. of Vienna, Austria, Nov. 2000, MAX phases
34. Ecole Centrale de Lyon, France, Nov. 2000.
33. Polytech. Instit. Milano, Italy, Nov. 2000.
32. EI-Tech Corp., Cleveland, OH, July 2000.
31. Brush-Wellman, Cleveland, OH, Feb. 2000.
30. University of Illinois-Chicago, Chicago, IL, April 2000.
29. Praxair, Indianapolis IN, Oct. 1999.
28. Black and Decker, Towson, MD, Oct. 1999.
27. Oak Ridge National Lab., Oak Ridge, TN, Oct. 1998.
26. TMS Fall Meeting, Chicago, Ill, Oct. 1998.
25. AMP Incorporated, Harrisburg, PA, June 1998.
24. University of Illinois, Urbana, Ill, April 1998.
23. Symposium on "Innovative Processing and Synthesis of Ceramics, Glasses, and Composites", 100<sup>th</sup>  
Annual Meeting of the American Ceramic Society in Cincinnati, OH, May 3-6, 1998.
22. Vesuvius Research Pittsburgh, PA, Feb. 1998.
21. ALCOA Tech. Center, Pittsburgh, PA, Feb. 1998.
20. National Institute for Standards and Technology, Gaithersburg, MD. September 1997.
19. Cabot Corporation, Boyertown, PA, Sept. 1996.
18. Wright-Patterson AFB, Dayton, OH, July 1996.
17. M. W. Kellogg, Houston, TX, July 1996.
16. ART, Buffalo, NY, May 1996.
15. University Of Penn, Phila., PA, May 1996.
14. Norton-Saint Gobain, Northboro, MA, April 1996.
13. Drexel University, Phila, PA, Feb. 1996.
12. GE Corporate Research and Development, Schenectady, N.Y., January 1996.

11. Max-Planck Institute Pulver Metallurgisches Laboratorium, Stuttgart, Germany, "Role of Silicon Oxynitride During Nitridation of Si Powders in Nitrogen, June 1994.
10. Max-Planck Institute Fur Festkorperforschung, Stuttgart, Germany, "Reduction Kinetics and Electrical Conductivity in Lead-Disilicate Based Glasses", May 1994.
9. NASA-Lewis Research Center, Cleveland, OH, "Fiber-Reinforced Ceramic Matrix Composites", February 1993.
8. Penn State, State College, Department of Materials Science and Engineering, "Transient Plastic Phase Processing of Ceramics", February 1993.
7. Purdue University, Lafayette, In., Department of Materials Engineering, "Transient Plastic Phase Processing of Ceramic Composites", November 1992.
6. Princeton University Plasma Physics Lab. Lecture Series, "Sun Dragon: The Making of a Solar Car", January 1992, Princeton, NJ
5. TMS Fall Meeting, "In-situ Processing of Ceramic/Ceramic Composites by Solid/Solid Reactions", October 8-11, 1991, Cincinnati, Ohio.
4. American Chemical Society (Education Division), "Glass Matrix Composites: Processing and Properties", August 1990, Wash., D.C.
3. Rutgers University, Piscataway, NJ, "Fiber-Reinforced Ceramics: Theory vs. Expt.", Oct. 1989.
2. Tokyo Institute of Technology, Tokyo, Japan, Sept. 1988, "Matrix Cracking in Uniaxially Reinforced Ceramic Matrix Composites".
1. NATO Advanced Study Institute on the Science and Technology of Fast Ion Conductors, Erice, Italy July 1-15, 1987, "Degradation of Ceramics in Alkali Metal Environments".

**Presentations and Posters:** (person presenting is in bold letters) This section has not been updated since 2009.

**MS&T**, Fall 2009 Meeting, Pittsburgh, PA. Direct Observation of Acousto-Elastic Hysteresis in Kinking Nonlinear Elastic Solids: **P. Finkel**, O. Yeheskel, M. W. Barsoum

**MS&T**, Fall 2009 Meeting, Pittsburgh, PA. Electronic, Elastic and Thermal Properties of  $Ti_2AlC$ ,  $Ti_3AlC_2$ ,  $Ti_3Al(C_{0.5},N_{0.5})_2$ ,  $Ti_2Al(C_{0.5},N_{0.5})$  and  $Ti_2AlN$ : T. Scabarozzi, M. Radovic, B. Manoun, J. Hettinger, S. Lofland, S. Amini, P. Finkel, & **M. W. Barsoum**.

**MS&T**, Fall 2009 Meeting, Pittsburgh, PA. "Thermal Stability and Effect of Texture on Ultrahigh Damping of Nanocrystalline Mg-Matrix Composites Reinforced with MAX Phases," **S. Amini**, M.W. Barsoum, A. R. McGhie, C. Ni, M. Odén, S. Vogel and D. Brown.

**MS&T**, Fall 2009 Meeting, Pittsburgh, PA "Mechanical Properties and Kinking Non-Linear Elasticity of Fully Dense  $Ti_2SC$  and  $Cr_2GeC$ ", S. Amini and **M. W. Barsoum**

**MS&T**, Fall 2009 Meeting, Pittsburgh, PA "Thermal Expansion of Select MAX Phases Measured by High Temperature X-ray Diffraction and Dilatometry", T. Scabarozzi, S. Amini, O. Leafner, A. Ganguly, S. Gupta, W. Tambussi, S Clipper, J. Spanier and M. W. Barsoum.

**MS&T**, Fall 2009 Meeting, Pittsburgh, PA, Electron-Backscattered Diffraction and Transmission Electron Microscopy Microstructural Study of Post-Crept  $Ti_3SiC_2$ : F. Barcelo, S. Doriot, T. Cozzika, M. Le Flem, J. Béchade, **M. Radovic**; M. W. Barsoum.

**MS&T**, Fall 2009 Meeting, Pittsburgh, PA, **The MAX Phases and Kinking Non-Linear Elastic Solids a Newly Identified Class of Solids: M. W. Barsoum**

**MS&T**, Fall 2009 Meeting, Pittsburgh, PA, Reactivity of  $Ti_2AlC$  with SiC Fibers and Powders up to

Temperatures of 1550°C, C. Spencer, J. Córdoba, E. Judd-Sierra, N. Obando, **M. Radovic**, M. Odén, L. Hultman, and M. W. Barsoum.

**MS&T**, Fall 2009 Meeting, Pittsburgh, PA, On the Reactivity of  $Ti_2AlC$  with  $Al_2O_3$  Fibers, C. Spencer, J. Córdoba, N. Obando, **M. Radovic**, M. Odén, L. Hultman and M. W. Barsoum

On The Spherical Nanoindentation Stress-Strain Curves, Effective Zero Point, And Their Applications, **S. Basu**, A. Moseson and M. W. Barsoum, Workshop on in-situ methods in nanomechanics, Lawrence Berkeley National Laboratory, Aug. 2007, Berkeley, CA. **Poster**

On The Determination Of Spherical Nanoindentation Stress-Strain Curves, Surface Zero Point, And Their Applications, S. Basu, A. Moseson & M. W. Barsoum, MRS Fall Meet., Nov. 2007, Boston, MA. **Poster**

Spherical Nanoindentation Stress-Strain Analysis and Applications, **S. Basu** and M. W. Barsoum, Frontiers in Mechanical Engineering 2008: Nanomechanical Engineering, University of Pennsylvania, May 2008, Philadelphia, PA. **Poster.**

107th Annual Meeting American Ceramic Society, April, 2005, Baltimore, MD, "Joining of  $M_{n+1}AX_n$  Phases at Elevated Temperatures", **A. Ganguly**, M. W. Barsoum and R. D. Doherty.

107th Annual Meeting American Cer. Soc., April, 2005, Baltimore, MD, "Low Temp. Elastic and Electronic Properties of  $Ti_3Si_{1-x}(Ge/Al)_xC_2$  and  $Ti_2AlC_yN_{(1-y)}$  Solid Solutions", **A. Ganguly**, M. W. Barsoum, P. Finkel, J. Hettinger, S. Lofland, K. Harrell, Z. Sun, S. Ali & R. Ahuja.

107th Annual Meeting of the American Ceramic Society, Apr. 10-13, 2005, Baltimore, MD, "Theory of Kinking Nonlinear Elastic Solids", **A. Zhou**, M. W. Barsoum, T. Zhen, Z. M. Sun, S. R. Kalidindi

ECS: 207th Meeting "Carbon Nanotubes and Nanostructures: Fundamental Properties and Processes", Oral Pres. **J. Chmiola**, G. Yushin, R. Dash, E. Hoffman, J. Fischer, M. W. Barsoum and Y. Gogotsi.

29th Annual Cocoa Beach Meeting, Jan. 23-28, 2005, Cocoa Beach, FL, "Tribological Properties of MAX phase", with **S. Gupta**, Z. M. Sun, A. Ganguly, T. Palanisamy, E. Passman & C. W. Li

29th Annual Cocoa Beach Meeting, Jan. 23-28, 2005, Cocoa Beach, FL, Synthesis and Consolidation of Single-Phase Ternary Compound  $Ti_3SiC_2$  via Pulse Discharge Sintering (PDS), with **Z. M. Sun**, M. W. Barsoum, H. Hashimoto, and Z. F. Zhang. (Poster).

29th Annual Cocoa Beach Meeting, Jan. 23-28, 2005, Cocoa Beach, FL, "Mechanical and Damping Properties of Porous  $Ti_3SiC_2$ ", with **Z. M. Sun**, A. Zhou, T. Zhen, A. Murugaiah, M. W. Barsoum and T. El-Raghy.

29th Inter. Conf. on Advanced Ceramics and Composites, Amer. Ceram. Soc., Jan 23-28, 2005, Cocoa Beach, FL, "Nanoindentations in Ceramic Single Crystals", **S. Basu**, A. Murugaiah, Z. Sun, S. R. Kalidindi and M. W. Barsoum.

29th Inter. Conf. on Advanced Ceramics and Composites, Ceramic Society, Jan 23-28, 2005, Cocoa Beach, FL, "Nanoindentations in Sapphire Single Crystals", **S. Basu**, A. Murugaiah, Z. Sun, S. R. Kalidindi and M. W. Barsoum.

MRS Meeting Fall 2004, "First Order Raman Scattering from MAX Phases", Oral Presentation: **J. S. Spanier**, S. Gupta and M. W. Barsoum.

MRS Meeting Fall 2004, "Effect of Al additions on the synthesis of single-phase  $Ti_3SiC_2$ " Poster with **Z. M. Sun**, S. L. Yang, H. Hashimoto and M. W. Barsoum

MRS Meeting Fall 2004, "Growth Model and Observations of Soft Metal Whiskers", Oral Presentation : **E. N. Hoffman**, M. W. Barsoum, R. D. Doherty, and A. Zavaliangos.

MRS Meeting Fall 2004, "Ductile Machinable Ternary Carbides and Nitrides: A New Class of Solids", M. W. Barsoum.

MRS Meeting Fall 2004, "Tribological and Wear Studies of MAX Phases and Its Composites", Oral Presentation: **S. Gupta**, Z. M. Sun, M. W. Barsoum, T. Palanisamy, E. Passman and C. W. Li.

MRS Meeting Fall 2004, "Kinking Nonlinear Elastic Solids & Spherical Nanoindentations", Oral Presentation, **M. W. Barsoum**, A. Murugaiah, T. Zhen, S. Basu and S. R. Kalidindi.

MRS Meeting Fall 2004, "Spherical Nanoindentations in Mica, Graphite and Sapphire", Oral Presentation: **S. Basu**, A. Murugaiah, M. W. Barsoum, Z. M. Sun, S. R. Kalidindi and Y. Gogotsi.

ECS, 203<sup>rd</sup> Meeting, Paris, France. "Synthesis and Oxidation of  $Cr_2AlC$  and  $V_2AlC$  in Air", by S. Gupta and **M. W. Barsoum**,

ECS, 203<sup>rd</sup> Meeting, Paris, France. "Oxidation of  $Ti_{n+1}AlX_n$  where  $n = 1-3$  and X is C and/or N", by **M. W. Barsoum**, N. Tzenov, A. Procopio, T. El-Raghy and M. Ali

ECS, 203<sup>rd</sup> Meeting, Paris, France. "Long Time Oxidation Study Of  $Ti_3SiC_2$ ,  $Ti_3SiC_2/SiC$  and  $Ti_3SiC_2/TiC$  Composites in Air, by **M. W. Barsoum**, L. H. Ho-Duc, M. Radovic and T. El-Raghy.

ACers, 105<sup>th</sup> Annual Meeting, Nashville, TN, "Nanoindentation of a Natural Nanolaminate Material:  $Ti_3SiC_2$ ", by **A. Murugaiah**, M. W. Barsoum, S. R. Kalidindi, T. Zhen and Y. Gogotsi.

ACers, 105<sup>th</sup> Annual Meeting, Nashville, TN, "Synthesis and Oxidation Kinetics of  $Cr_2AlC$  in Air", by **S. Gupta** and M. W. Barsoum.

ACers, 105<sup>th</sup> Annual Meeting, Nashville, TN, "Synthesis and Oxidation kinetics of  $V_2AlC$  and  $(Ti,V)_2AlC$  in Air", by **S. Gupta** and M. W. Barsoum.

ACers, 105<sup>th</sup> Annual Meeting, Nashville, TN, "The 1300 °C Isothermal Sections in the Nb-Sn-C and Ti-In-C Ternary Phase Diagrams", by **A. Ganguly**, M. Barsoum and F. Aldinger.

ACers, 105<sup>th</sup> Annual Meeting, Nashville, TN, "Nanolaminates, Kink Bands and Fully Reversible Dislocation-Based Deformation Up to 1 GPa in  $Ti_3SiC_2$ ", by **T. Zhen**, M. W. Barsoum, S. Kalidindi, M. Radovic and A. Murugaiah

MRS Meeting Spring 2003, "Fully Reversible Dislocation-Based Deformation in a Nanolayered Carbide:  $Ti_3SiC_2$ ", by **M. Barsoum**, T. Zhen, S. Kalidindi and A. Murugaiah.

MRS Meeting Spring 2003, "Deformation Processes During Nanoindentation of  $Ti_3SiC_2$ ", Poster with A. Murugaiah, **M. W. Barsoum**, S. Kalidindi, and T. Zhen.

MRS Meeting Spring 2003, “Dual Tribological Behavior of a Nanolayered Ceramic:  $Ti_3SiC_2$ ”, Poster with **A. Souchet**, J. Fontaine, M. Belin, T. Le Mogne, J-L. Loubet and M. W. Barsoum.

SMEC Conf., Florida International University, March 2003, Miami, FL, “Nanoindentation of A Natural Nanolaminate:  $Ti_3SiC_2$  M. W. Barsoum, A. Murugaiyah, S. R. Kalidindi, T. Zhen and Y. Gogotsi.

APS March Meeting, Texas, 2003. “Low Temperature Transport Properties of the Natural Nanolaminates:  $Ti_3AlC_2$  and  $Ti_4AlN_3$ ”, with P. **Finkel**, J.D. Hettinger, S.E. Lofland.

APS March Meeting, Texas, 2003, “Low Temperature Electrical and Thermal Transport Properties of the Natural Nanolaminate  $V_2AlC$ ”. With J. D. Hettinger, P. **Finkel**, S. E. Lofland and S. Gupta.

Gordon Research Conference, Aug. 2001, “Deformation and Rupture of  $Ti_3SiC_2$  During Tensile Creep in the 1000-1200°C Temperature Range”, Poster with **M. Radovic**, T. El-Raghy and S. Wiederhorn

23<sup>rd</sup> Annual Cocoa Beach Meeting, Jan. 25-29, 1999, Cocoa Beach, FL, “Compression Creep Behavior of  $Ti_3SiC_2$  in the 1000-1200 °C Temperature Range” with **T. El-Raghy**, B. Tiberio, A. Zavaliangos.

Centennial Meeting of APS, March 20-26, Atlanta GA, “Temperature Dependence of the Elastic Properties of  $Ti_3SiC_2$ ”, Bulletin of American Physical Society, **44**, No.2, 1999, with **P. Finkel** and T. El-Raghy.

23<sup>rd</sup> Annual Cocoa Beach Meeting, Jan. 25-29, 1999, Cocoa Beach, FL, “Thermal Properties of  $Ti_3SiC_2$ ”, with T. El-Raghy, C. Rawn, A. Payzant and C. Hubbard.

23<sup>rd</sup> Annual Cocoa Beach Meeting, Jan. 25-29, 1999, Cocoa Beach, FL, “Room Temperature Ductile Carbides”, with T. El-Raghy

99th Annual Meeting of the Amer. Cer. Soc., May 4-7, 1997, Cinn., OH, “Effect of Micro-structure on Room and Elevated Temperature Mechanical Properties of  $Ti_3SiC_2$ ” with T. El-Raghy. C-005-97.

99th Annual Meeting of the Amer. Cer. Soc., May 4-7, 1997, Cinn., OH, “Surface Treatment of  $Ti_3SiC_2$ ”, with T. El-Raghy. C-006-97.

99th Annual Meeting of the Amer. Cer. Soc., May 4-7, 1997, Cinn., OH, "Oxidation of  $Ti_3SiC_2$  in Air", with T. El-Raghy and L. Ogbuji. C-007-97.

99th Annual Meeting of the Amer. Cer. Soc., May 4-7, 1997, Cinn., OH, "Polycrystalline Nanolaminates", with T. El-Raghy. C-008-97.

21st Annual Cocoa Beach Conference on Composites and Advanced Ceramics, Jan. 12-16, 1997, Cocoa Beach, FL., "Polycrystalline Nanolaminates,  $Ti_3SiC_2$ ,  $Ti_3GeC_2$  & the H-phases”, with T. El-Raghy

21st Annual Cocoa Beach Conference on Composites and Advanced Ceramics, Jan. 12-16, 1997, Cocoa Beach, FL., "Reaction Path and Microstructure-Property Relationships in  $Ti_3SiC_2$ ”, with T. El-Raghy

21st Annual Cocoa Beach Conference on Composites and Advanced Ceramics, Jan. 12-16, 1997, Cocoa Beach, FL., "Functionally Graded  $Ti_3SiC_2$  Materials”, with T. El-Raghy

1996 MRS Fall Meeting, Dec. 2-6, Boston, MA, “Polycrystalline Nanolaminates,  $Ti_3SiC_2$ ,  $Ti_3GeC_2$  & the H-phases”, with T. El-Raghy. V10.10



1996 MRS Fall Meeting, Dec. 2-6, 1996, Boston, MA, "Effect of Interplanar Debonding on the Properties of  $Ti_3SiC_2$  and the H-phases", with T. El-Raghy. W12.10

98th Annual Meeting of the Amer. Cer. Soc., April 14-18, 1996, Indianapolis, IN, " $Ti_3SiC_2$  & Other Truly Remarkable Ceramics", with T. El-Raghy.

98th Annual Meeting of the Amer. Cer. Soc., April 14-18, 1996, Indianapolis, IN, "Transient Plastic Phase Processing of Ceramic/Ceramic Composites and their Properties", with A. Zavaliangos, S. Kalidindi and D. Brodtkin

98th Annual Meeting of Amer. Cer. Soc., April 14-18, 1996, Indianapolis, IN, "Processing of Fully Dense Single Phase  $Ti_3SiC_2$  and  $Ti_3SiC_2$ -TiC Composites", with T. El-Raghy.

95th Annual Meeting of the Amer. Cer. Soc., April 18-22, 1993, Minneapolis, MN, "A Novel Technique to Measure Axial Thermal Residual Strains and Critical Lengths of Ceramic Fibers and Whiskers", with A. Elkind. SII-78-93.

95th Annual Meeting of the Amer. Cer. Soc., April 18-22, 1993, Minneapolis, MN., "Transient Plastic Phase Processing of Ultra-Refractory Composites".

95th Annual Meeting of the Amer. Cer. Soc., April 18-22, 1993, Minneapolis, MN., "Role of Oxynitride Formation During Nitridation of Si Powders in Nitrogen", with T. Parker. SX-10-93

1992 MRS Fall Meeting, "Thermodynamics and Kinetics of Nitridation of Si Powders in Nitrogen", with T. Parker, K2.4.

1992 World Metallurgy World Congress, June 21-26, San Francisco, CA "Formation of TiC and  $TiB_2$  Composites",

94th Annual Meeting of the Amer. Cer. Soc., April 12-16, 1992, Minneapolis, MN, "Low Voltage-High Current Density ZnO Varistors", with A. Elkind and F. Selim. 16-E-92.

94th Annual Meeting of the Amer. Cer. Soc., April 12-16, 1992, Minneapolis, MN, "Matrix Cracking in Uniaxially Fiber-Reinforced Ceramic Matrix Composites:, Part I. Effect of Matrices", with P. Kangutkar and A. S. D. Wang. 38-SII-92.

94th Annual Meeting of the Amer. Cer. Soc., April 12-16, 1992, Minneapolis, MN., "Matrix Cracking in Uniaxially Fiber-Reinforced Ceramic Matrix Composites:, Part II. Effect of Fiber diameter, Residual Stresses and Interfacial Bonding", with P. Kangutkar & A. S. D. Wang.

93rd Annual Meeting of Amer. Cer. Soc., April 28-May 2, 1991, Cincinnati, OH, "Reduction Kinetics of Lead Silicate Based Glasses", with S. Kumar, A. Then and W. Tasker.

93rd Annual Meeting of the American Ceramic Society, April 28-May 2, 1991, Cincinnati, OH, "Effect of Temperature and Environment on the Interfacial Shear Strengths Between SiC and Glass" with I. Tung and H.M. Chou.

93rd Annual Meeting of the American Ceramic Society, April 28-May 2, 1991, Cincinnati, OH., "Reactive Sintering and Forging of In Situ Formed, Fully Dense  $TiB_2$ /TiC Composites", with B. Houg and R. Sands.

93rd Annual Meeting of the American Ceramic Society, April 28-May 2, 1991, Cincinnati, OH., "Matrix Cracking in Fiber-Reinforced Ceramic Matrix Composites", with P. Kangutkar.

7th CIMTEC World Congress, Montecatini, Italy, June 1990. "Matrix Cracking Stresses in Uniaxially Fiber Reinforced Ceramic Matrix Composites", with P. Kangutkar & A. S. Wang.

92nd Annual Meeting of the American Ceramic Society, April 22-26, 1990, Dallas, TX., "Effect of Temperature and Fabrication Environments on Interfacial Shear Strengths in SiC Fiber-Glass Composites", with F. Ardite and H. Chou (62-SIV-90)

91th Annual Meeting of the American Ceramic Society, May 1-5, 1989, Indianapolis, In., "Matrix Cracking Stresses in Uniaxially Fiber Reinforced Ceramic Composites", (71-SI-89)

13th Annual Conference on Composites and Advanced Ceramics, Jan. 15-18, 1989. Cocoa Beach, FL., "Reaction Mechanisms During Nitridation of Silicon Powder", with P. Kangutkar & M.J. Koczak. (38-C-89F).

4th Annual Northeast Meeting, Processing and Applications of High Tc Superconductors: Status and Prospects, May 9-11, Rutgers University, New Brunswick, NJ. Co-sponsors Met. Soc., MRS and ASM. "Effect of Magnetic field on Separation and Classification of Superconducting Powders", with S. Tyagi.

90th Annual Meeting of the American Ceramic Society, May 1-5, 1988, Cincinnati, OH., "Lithium Ceramic Interactions", with B. Bae. (217-B-88)

90th Annual Meeting of the American Ceramic Society, May 1-5, 1988, Cincinnati, OH "Microcracking in Ceramic Composites", with S. Holder and S. Freiman. (26-C-88)

90th Annual Meeting of the Amer. Ceram. Soc., May 1988, Cincinnati, OH, "Use of the Meissner Effect to Separate, Purify and Classify Superconducting Powders", with D. Patten and S. Tyagi. (68-SII-88).

89th Annual Meeting of the American Ceramic Society, April 30, 1987, Pittsburg, PA., "Microcracking in Ceramic/Ceramic Composites", with Z. Zhou. (49-C-87)

171st Meeting of the Electrochemical Society, May 10-15, 1987. Philadelphia, Pa. "Thermodynamics and Kinetics of Li/Ceramic Interactions", with K. Pytlewski.

5th International Conf. on Solid State Ionics, Aug. 18-24, 1985, Lake Tahoe, CA. "In Situ Determination of the Reactions Between Li and Fast Ion Conducting Glasses", with H. Tuller.

## **TEACHING**

### **Undergraduate:**

- E-848 Fundamentals of Ceramics
- E-880 Electronic Properties of Materials
- E-801 Fundamentals of Materials
- E-831 Thermodynamics of Materials Processing

### **Graduate:**

- G-823 Structure and Properties of Ceramics and Electronic Materials

G-880 Special Topics: "Modern Electrochemistry"  
G-880 Special Topics: "Processing of High Performance Ceramics".  
G-880 Special Topics: "Structure and Properties of Ceramics, Part II."  
G-580 Introduction to Solid State Materials.  
G 580 Special Topics: "Materials for High Temperature and Energy Applications".

## **PUBLIC SERVICE**

Participated NSF sponsored workshop: Fundamental Research Needs in Ceramics, held in Arlington, D.C. on June 10-11, 1997.

Committee Membership

Phase Equilibria Program, Amer. Cer. Soc., 1997-2000.

## **Peer Reviewer**

Journals: Nature, J. Amer. Cer. Soc., J. Europ. Cer. Soc., Materials Science and Engin., J. Applied Physics, Applied Physics Letters, Acta and Scripta Mater., Tribological Letters., Phys. Rev. B., Small, Nature, Science.

Proposals: National Science Foundation, STCU.

## **STUDENTS SUPERVISED**

PhD: **Highlighted entries are currently in academia.**

- 91 P. Kangutkar, "Matrix Fracture Mechanisms in Fiber Reinforced Ceramic Composites".
- 94 S. Kumar, "Reduction Kinetics and Electrical Conductivity in Lead-Disilicate Glasses".
- 96 D. Brodtkin, "Transient Plastic Phase Processing of Ti-B-C Composites & their Properties".
- 97 T. El Raghy, "Processing and Characterization of  $Ti_3SiC_2$ ", with A. Zavaliangos and S. Kalidindi.
- 00 C. Wilkinson Mager, "Development of a Zirconium Toughened Hydroxyapatite", with L. Shadler.
- 01 **M. Radovic, "Effect of Temperature and Microstructure of Tensile and Tensile Creep Properties of  $Ti_3SiC_2$  in Air". With T. El-Raghy. Texas A&M**
- 03 P. Finkel, "Low Temperature Elastic and Electronic Properties of MAX Phases".
- 04 A. Murugaiah, "Nanoindentations in Kinking Nonlinear Elastic Solids", with S. Kalidindi.
- 04 T. Zhen, "Compressive Behavior of Kinking Nonlinear Elastic Solids -  $Ti_3SiC_2$ , Graphite, Mica and BN", with S. Kalidindi.
- 06 A. Ganguly, "Synthesis and Characterization of MAX Phase Solid Solutions".
- 06 **S. Gupta, "Tribology of MAX Phases and Their Composites". North Dakota State University**
- 06 E. Hoffman, "Carbide Derived Carbon from MAX-Phases and their Separation Applications", with Y. Gogotsi.
- 08 S. Basu, "On Spherical Nanoindentation Stress-Strain Curves, Creep and Kinking Nonlinear Elasticity in Brittle, Hexagonal Single Crystals", with S. Kalidindi.
- 08 **A. Zhou, "Kinking Nonlinear Elastic Solids: Theory and Experiments", with S. Kalidindi. Henan University, China.**

- 09 S. Amini, "On the Effect of Texture on Kinking Non-Linear Elasticity of MAX Phases and MAX-Reinforced Mg Matrix Composites"
- 09 A. R. Sakulich, "Mechanical and Chemical Characterization of Alternative Cements and Ancient Building Materials." Worcester Polytechnic Institute, Worcester, PA.
- 09 T. Scabarozi, "Combinatorial Investigation of MAX Phases Ternary Carbide Thin Films."
- 11 A. Moseson, "Design and Implementation of Alkali Activated Cement For Sustainable Development"
- 13 N. Lane " Lattice Dynamical Studies of Select MAX Phases", (with J. Rondinelli).
- 14 M. Naguib, " MXenes: A New Family of Two-Dimensional Materials and its Application as Electrodes for Li-ion Batteries", (with Y. Gogotsi).
- 14 B. Anasori, "Mg/MAX Composites: Characterization and Properties".
- 15 O. Mashtalir, "Chemistry of 2D Transition Metal Carbides (MXenes) (with Y. Gogotsi).
- 15 M. Shamma, "On Buckling, Kink Boundaries and Kinking Nonlinear Elastic Solids" (With A. Kontsos).
- 16 J. Griggs, "Investigation of the Reversible Hysteresis Effect in Hexagonal Metal Single Crystals and the MAX Phases", (with Mitra Taheri).
- 16 D. Tallman, "On the Potential of the MAX Phases for Neutron Applications"
- 16 M. Lukatskaya, "Capacitive Performance of 2D Metal Carbides", (with Y. Gogotsi).
- 16 J. Halim, "An X-Ray Photoelectron Spectroscopy Study of Multilayered Transition Metal Carbides (MXenes)"
- 17 M. Ghidui, "Chemistry of MXene Conductive Clays".
- 18 S. Kota, "High Frequency Supercapacitors"

#### MASTERS

- 88 B. Bae, "Interactions of Lithium with Lithium Borates".
- 89 P. Kangutkar, "Processing of Reaction Bonded Silicon Nitride", with M. Koczak.
- 90 J. Medoff, "Processing/Property Relationships in  $Y_1Ba_2Cu_3O_{7-x}$ ".
- 90 S. Liou, "Ceramic Thermal Barrier Coatings on Graphite Epoxy Composites", with R. Smith
- 91 B. Houg, "Transient Plastic Phase Processing of Ti-B-C Composites".
- 92 T. Lien, "ZrC/ZrB<sub>2</sub> Composites Processed by Reaction Hot Pressing"
- 93 T. Parker, "Thermodynamics and Kinetics of the Nitridation of Si Powders in N<sub>2</sub>"
- 93 P. Ciccone, "The Design and Fabrication of Sudragon IV".
- 98 S. Chakraborty, "Processing and Characterization of Some H-phases", with T. El-Raghy.
- 99 M. Ali, "Processing and Characterization of Ti<sub>2</sub>AlC, Ti<sub>2</sub>AlC<sub>0.5</sub>N<sub>0.5</sub> and Ti<sub>2</sub>AlN", with T. El-Raghy
- 99 A. Procopio, "Synthesis and Characterization of Ti<sub>4</sub>AlN<sub>3</sub>", with T. El-Raghy.
- 01 I. Salama, "Synthesis and Characterization of the Ternary Carbides Nb<sub>2</sub>AlC and (Ti,Nb)<sub>2</sub>AlC" with T. El-Raghy.

- 02 J. Travaglini, "Corrosion Behavior of  $Ti_3SiC_2$ "
- 02 L. Ho-Duc, "Synthesis and Characterization of the Properties of  $Ti_3SiC_2/SiC$  and  $Ti_3SiC_2/TiC$  Composites".
- 07 A. Moseson, "Spherical Nanoindentation: Insights And Improvements, Including Stress-Strain Curves and Effective Zero Point Determination".
- 09 J. Lloyd, "Investigation of the Ternary Carbides  $Nb_2PC$  and  $Mo_2BC$ "
- 10 I. Albaryak, "Mechanical Properties of Polycrystalline Ceramics as Determined by Nanoindentation Methods: Effect of Surface Roughness and Tip Size"
- 10 C. J. Spencer, "Fiber-Reinforced  $Ti_3SiC_2$  and  $Ti_2AlC$  MAX Phase Composites"
- 14 M. Nelson, " $Cr_2AlC$  and  $Ti_3SiC_2/Mg$  composites: Fabrication and Properties"
- 15 M. Agne, "The Stability of  $Ti_2AlC$  and  $V_2AlC$  with Al, and the Synthesis of Composites in the Al-Ti-B-C and Al-V-C systems".
- 16 Grady Bentzel, No thesis option.
- 19 E. Mayerberger, "Diffusion through MXenes", (with Caorline Schauer).