Microchemical Systems for Electrochemical CO_2 Reduction and Protein/Pharmaceutical Crystallization

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Microchemical systems have potential for a wide range of applications. The main part of the presentation will highlight our recent efforts in catalyst, electrode, and electrolyzer design and characterization for *the electrochemical conversion of CO_2 into value-added chemicals* such as CO, ethylene, and ethanol, as an approach to reduce CO_2 emissions. Our efforts, often with collaborators, have led to multiple improved catalysts, electrodes and reactor designs, which have helped pave the path towards ongoing pilot plant testing. The second part will focus on *microfluidic platforms for crystallization,* for structural analysis of (membrane) protein crystals and for screening of solid forms of pharmaceuticals. These array chips drastically reduce the amount of material needed thus many more conditions can be screened. Also, they eliminate the need for manual handling of fragile crystals by allowing for on-chip characterization of multiple crystals in rapid sequence by either X-ray diffraction or Raman spectroscopy.