

## EXPIRE – EXtremely Passive Impact Resistant Electrolyte

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Aprotic battery electrolytes in rechargeable Li-ion chemistries are prone to catching fire leading to dramatic pictures and expensive engineering solutions to prevent catastrophic failures. Imagine however if one could change the electrolyte from something to fear to something intrinsic to the safety of the battery. This presentation will explore such a concept. These electrolyte materials undergo a rapid liquid to solid phase transition upon impact preventing the electrodes from touching. Furthermore, upon shear thickening the ionic conductivity of the electrolyte drops by several orders of magnitude. The chemistry of these materials will be discussed and if possible ballistic tests will be presented.

#### Biosketch:

Gabriel Veith is a Senior Staff Scientist and Team Lead for the Thin film and Fundamental Electrochemistry group within the Materials Science and Technology Division at ORNL. His research focuses on the development of new materials and processes related to energy storage/conversion applications as well as fundamental studies of liquid-solid interfaces. Particular areas of focus include sodium ion battery chemistry, using neutrons to probe reactive interfaces, physical vapor deposition processes to coat vacuum stable materials, and solid state batteries. He has 176 published papers, 4 patents, 6 patents submitted, and two R&D 100 awards. He is also the honorary scientific advisor for the Charlotte-Mecklenburg Police Department (Burglary Division).