



The Electrochemical Society
Seminar Notice: Thursday, Apr 15, 2010

Evaluating Mechanical Integrity of Lithium-Ion Cells and Battery Packs through Computational Modeling

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There are three interrelated aspects of battery safety: electrical integrity, thermal integrity, and mechanical integrity. This talk deals with the latter as it is the least studied but the most vital aspect of safety for electric cars. A general procedure will be outlined on the development of a constitutive and computational model of a cylindrical cell. It will be shown that an average homogenized property of a battery cell can be determined through a combination of physical testing, closed form solutions, and numerical simulations. Particular emphasis will be placed on correct prediction of initiation and propagation of a tearing fracture of the outer can. The computational model correctly predicts rupture of the steel can which could release aggressive chemicals, fumes, or spread the ignited fire to the neighboring cells. The initiation site of skin fracture depends on many factors such as the ductility of the casing material, constitutive behavior of the system of electrodes, and type of loading. In the second part of the talk, a numerical study of a localized impact response of the entire battery pack will be explained. The battery pack model is specifically useful in predicting the amount of damage/crash/intrusion to the battery pack including initiation and propagation of cracks in the protective shell in case of an accident.

Date: Thursday, Apr 15th, 2010

Location: Lawrence Technological University

21000 West Ten Mile Road, Southfield, MI 48075

Building #5 (Taubman Welcome Center), 4th Floor, Room 406

Use Parking Lot A, C or D (Lots C & D are accessed off NW Highway)

Time: 5:30 pm Reception / 6:30 pm Dinner / 7:30 pm Speaker

Price: \$20 Members / \$22 Guests / \$10 Students

Payment: Cash or Check

RSVP by: Wednesday, April 7, 2010 to Kent Snyder

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<http://www.electrochem.org/ecs/sections/detr/detr.htm>



