

The 107th GREEN Seminar



Dealing with mechanical issues in
batteries: Future challenges,
strategies, and opportunities

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Volumetric changes in lithium-ion batteries are effectively intrinsic to these devices due to the movement of ions during charging and discharging. While this has implications for both the cathode and anode materials, which must reversibly accommodate and expel the arriving and departing ions, it is the asymmetry between the expansion and contraction of the electrodes that leads to an increasing number of mechanically oriented challenges. In particular, the pursuit of “high-capacity” anode materials will inevitably give rise to problems stemming from a fundamental link between capacity and volumetric deformation. At the cell level, this leads to the known challenges associated with both electrode design and accelerated capacity fading. In this talk, challenges, strategies, and opportunities associated with the choice of anode material in lithium-ion batteries will be discussed. Extending from this discussion, the use of novel sensing strategies, such as with fiber optics, will be explored as the merits for utilizing photonic-based monitoring offers a range of advantages over other sensing approaches. Opportunities for novel information gathering and unique insights into the State of Health and State of Safety will be explored.

Venue: Auditorium, 1F, NanoGREEN/WPI-MANA Bldg.,
Namiki-site

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