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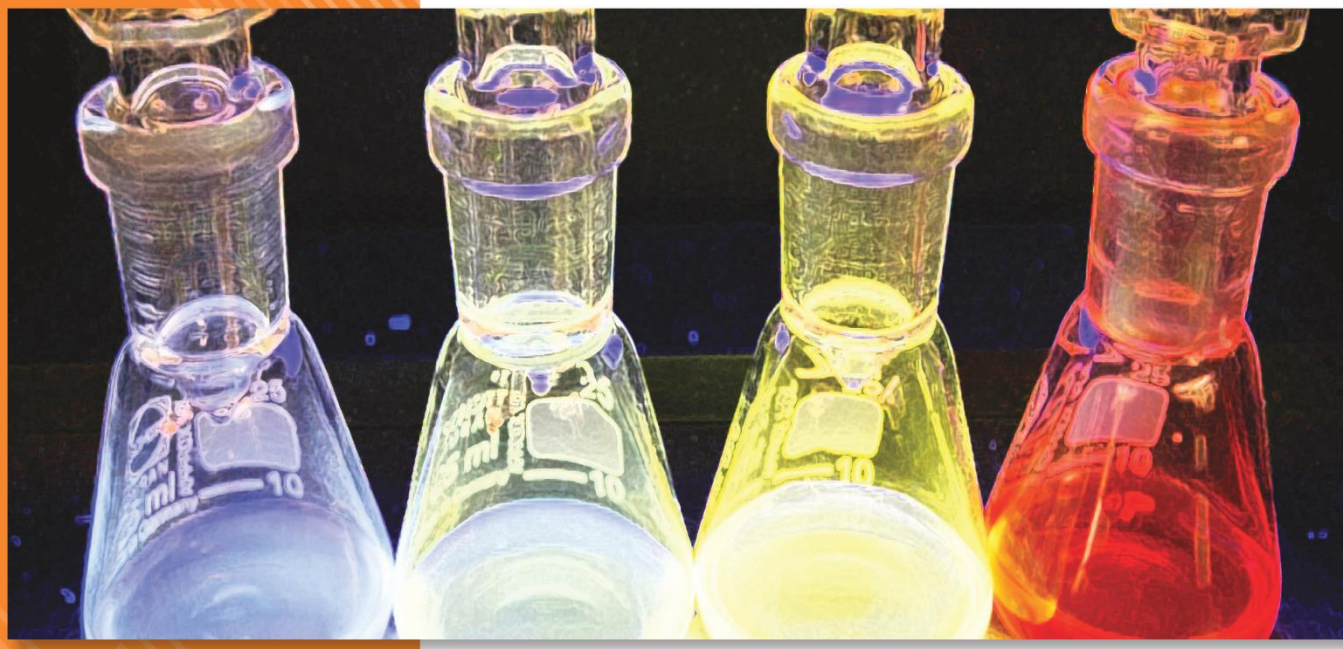

# Thin-film sensors for in-situ monitoring of Li-ion cells in electric vehicle

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One of the key components of electric vehicle and future mobility are lithium-ion cell and battery systems. This technology features high energy density, high power density, long service life and environmental friendliness. A challenging aspect for automotive application is to ensure the battery safety within a narrow operation region. Commonly, the state-of-the-art monitoring of batteries is limited to cell external measurements. Thus, a critical and fast change of internal parameter leading to a hazardous event could remain undetected. In contrast, an in-situ measurement of lithium-ion cell parameter like local temperature would enable the early detection of safety critical events.

Within this talk, the global challenges of electro-mobility are discussed from the perspective of a lithium-ion cell manufacturer with focus on safety aspects. Furthermore, an analysis of suitable sensors for in-situ cell measurements is demonstrated based on automotive development processes. Basic requirements are derived and suitable thin-film technologies are evaluated. A validation of the developed sensor concepts is demonstrated based on novel integration of thin-film sensors in large Li-ion cells.