NCPRE NEWS

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National Centre for Photovoltaic Research and Education
www.ncpre.iitb.ac.in
A Project of the Ministry of New and Renewable Energy at IIT Bombay

"Ultra-safe Lithium-ion and/or Lithium-polymer batteries"

Safety is a major concern in current lithium-ion battery technology. NCPRE's Energy Storage Group is focusing on a promising candidate SnS (Tin Sulphide) along with simultaneous development on nano-Si anode to develop safe batteries for the future. Conventional LiBs are prone to catch fire, one example being the Samsung Galaxy Note 7 disaster. The vulnerability of these batteries jeopardizes the safety of the device using these batteries, especially in the applications such as grid storage and automotive. The threat implications in Indian context are substantial because of India's large and growing demand for LiBs which is fueled by both private demand for consumer electronics and government policies pertaining to renewable energy and electric vehicles.

Currently, the battery manufacturers mitigate the fire risks in the batteries by using ancillary sub-systems such as thermostats, in the battery management system, which monitor battery temperature and disconnect batteries experiencing temperature higher than a threshold. However, such systems can't prevent battery fires under all operating conditions as the fire vulnerability of the current LiBs is inherent to the materials used inside them. Moreover, such systems make the battery pack costlier, bulkier and heavier. Thus, the solution for the fire problem lies in the material innovation. We have developed the next generation of Li-ion batteries which have no risk of catching fire.

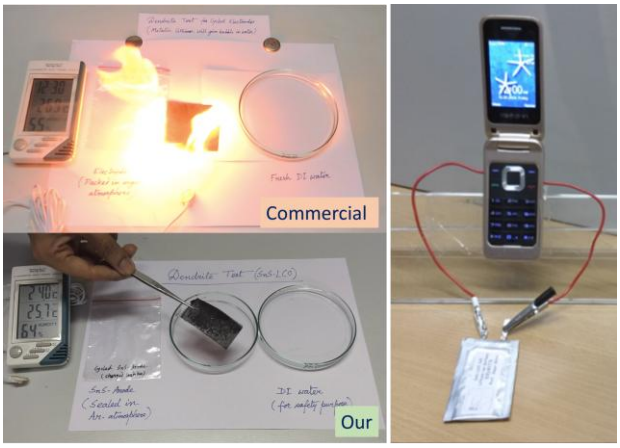

Fig: The commercial battery that catches fire. Our battery with SnS anode doesn't catch fire in the same condition.

Here, we are able to achieve this fire-resistant property by replacing the graphite-based anodes (negative terminal of battery) used in conventional batteries with advanced Tin -based anodes developed by us. This technology fortunately brings low-cost precursors to synthesize anode nanoparticles, featuring the world's fastest solution-based and scalable route to very high conversion yield of ~98%.

In addition, introducing SnS, will enable a dramatic improvement in energy density. We have produced LiB cells which can store more than double the energy in volume compared to current technology, making this commercially viable, especially for grid application. **The current innovation idea won the AIT (Academia Industry Training) program-2017/2018 award in Switzerland.**

Ref: https://www.startupticker.ch/en/news/may-2018/grand-finale-of-the-ait-program-episode-4