

# Na-Ion Batteries for Large Scale Applications: A Review on Anode Materials and Solid Electrolyte Interphase Formation

*Miguel Ángel Muñoz-Márquez,\* Damien Saurel, Juan Luis Gómez-Cámer, Montse Casas-Cabanas, Elizabeth Castillo-Martínez, and Teófilo Rojo\**

The urgent need for optimizing the available energy through smart grids and efficient large-scale energy storage systems is pushing the construction and deployment of Li-ion batteries in the MW range which, in the long term, are expected to hit the GW dimension while demanding over 1000 ton of positive active material per system. This amount of Li-based material is equivalent to almost 1% of current Li consumption and can strongly influence the evolution of the lithium supply and cost. Given this uncertainty, it becomes mandatory to develop an energy storage technology that depends on almost infinite and widespread resources: Na-ion batteries are the best technology for large-scale applications. With small working cells in the market that cannot compete in cost (\$/W h) with commercial Li-ion batteries, the consolidation of Na-ion batteries mainly depends on increasing their energy density and stability, the negative electrodes being at the heart of these two requirements. Promising Na-based negative electrodes for large-scale battery applications are reviewed, along with the study of the solid electrolyte interphase formed in the anode surface, which is at the origin of most of the stability problems.