

Next Generation Automotive Batteries - Challenges in Research and Application

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The development of e-mobility is at a tipping point with increasingly optimistic forecasts for the future market share of electric vehicles. Nonetheless, for electric vehicles to achieve mass-market penetration, a further improvement in the ratio between driving range and costs is mandatory. Different strategies are considered nowadays which enable a substantial increase in electric range. Optimization of battery pack, cell, and electrode design offers the potential for some, although limited, improvement. Indeed, the largest impact on energy density could be realized through the introduction of novel cathode and anode materials. A vast number of electrode materials are in research or development stage, with larger discharge capacities and more favourable operating voltages. Nevertheless, only a few of them have chances to meet automotive requirements, particularly in terms of lifetime and safety. Considerable improvements in these respects are still required, before a possible industrialization of the new generations of batteries for automotive application can be envisaged. In parallel, more revolutionary concepts based on post-lithium as well as on full-solid-state systems are evolving and could offer an even larger improvement potential. This presentation will outline the potential and limits of present material concepts from a car manufacturer point of view. In particular, it will address open issues to be solved in the future development of electric energy storage technologies for automotive applications.