

Cathode active materials for lithium-ion batteries in automotive application

Pascal Hartmann,^{a,b}

^a *BASF SE, 67056 Ludwigshafen am Rhein, Germany*

^b *Battery and Electrochemistry Laboratory (BELLA), KIT, 76344 Eggenstein-Leopoldshafen, Germany*

e-mail: *pascal.hartmann@basf.com*

Today, nickel and cobalt play an important role in current cathode materials for lithium-ion batteries (LIBs). The metals contribute strongly to the electrochemical performance, the costs and the sustainability of LIBs.

This talk presents recent advances of BASF R&D in the development of low-cobalt cathode materials. Already today, the latest generation of cathode materials contains 80% (of the transition metals) or more nickel to meet both the energy density and costs targets of OEMs. Consequently, the chemical solutions developed by BASF to improve the performance in cycle life and impedance built-up of these materials are shown that lead to a cycle life of more than 1000 cycles at 45 °C.

In the second part of the talk mechanistic insights into the structural changes of nickel-rich cathode materials are given. For this we investigated the anode and cathode chemistry of single layer pouch cells with >80% Ni cathode active material over more than 700 cycles using both operando and post-mortem analytical techniques. Finally, the BASF strategy beyond nickel-rich cathode materials is presented.