Vacuum Coating in All-Solid-State-Battery Manufacturing: Applications, Prospects and Challenges

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Batteries have become both the major driver and bottleneck for automotive electrification. Beside the requirements on cost reduction and environmental friendliness, the most important customer demand is a short charging time combined with a high driving range per charging cycle at a high safety level. However, state-of-the-art lithium-ion batteries do not provide this combination of performance values. All-solid-state batteries are probably the approach with the highest expectations to be able to overcome this limitation. By changing the electrolyte from liquid to solid, the scope is to enable new electrode materials that can store more energy at a lower weight and volume as well as to avoid the thermal propagation. What goes together with this change of the design and chemistry is the requirement to develop new manufacturing processes for almost all components of the battery cell.

The aim of this industrial workshop is to discuss how vacuum coating can be integrated in the manufacturing process of next-generation all-solid-state battery cells. In an initial presentation, an overview will be given on potential applications of vacuum coating in all-solid-state battery manufacturing. The prospects, challenges and the competing technologies for vacuum coating will be introduced from the viewpoint of a manufacturer of battery cells as well as from the viewpoint of a manufacturer of vacuum coating equipment. A side effect of this presentation will be that the participants will get an overview on the most important concepts of all-solid-state batteries. Based on the presentation, we will discuss in the workshop how the challenges can be addressed by developing adjusted vacuum coating processes.

The outcome of the workshop will be an overview on how vacuum coating can become integrated into the value chain of all-solid-state batteries and which applications should be focused on from a market opportunity perspective.