**Investigation of edge formation during the coating process of li-ion battery electrodes**

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**Extended Abstract:**

In today's production of battery cells, the slot-die coating process in large roll-to-roll systems is state of the art. In addition to the known limiting coating defects, such as air entrainment and low-flow streaks (Schmitt et al. 2013), there is a formation of elevated bulges on the edges of the coating, which can cause damage in subsequent process steps and reject in the industrial process (Schmitt et al. 2014).



**Figure 1:** Schematic representation of the cross section of a coated electrode (left) and experimentally determined height profile of the coating (right).

In industrial continuous cell production, edge elevations are removed except at the position of the current collector, where it is not possible to cut away the edges, resulting in high material waste. During calendaring and rolling up electrodes, edge elevations at the current collector can lead to an inhomogeneous force distribution over the width of the coating, which causes waves and cracks at the edges of the electrode. This problem is intensified especially in the production of thick electrodes. The dimensions of the edge elevations can be minimized by a combination of suitable internal fittings in the slot die and an adjustment of relevant process parameters such as the gap between slot die and current collector and the wet film thickness of the coated electrode. Schmitt et al. have already published studies on the influence of the gap and the coating speed on the edge geometry (Schmitt et al. 2014). To be able to minimize the edge elevations, it is important to develop an understanding of the process.

In order to reduce edge elevations, a procedure has been developed, in which the internal geometry of the slot die is adapted in a suitable manner. In this work, the influence of material properties, process parameters and the internal geometry of the slot die on the edge formation was investigated experimentally. With this knowledge, the development of edge formation can be predicted.

**References:**

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