

Monitoring of extrudate properties during electrode production with the multisensory mouthpiece

Dirk Hofmann¹, Martin Schulze¹, Susan Walter¹, Henning Heuer¹, Granit Jashari²

¹Testing Systems, Fraunhofer IKTS, Germany, ¹Cell and Process Development, Fraunhofer IKTS, Germany

The properties and performance of an electrode are strongly determined by the quality of the slurry production process. One parameter by which this can be measured is viscosity. This can be changed due to slurry properties, such as the conductive carbon black content or distribution, or its solid content. Therefore, it is of great relevance to evaluate the quality of the slurry at an early stage in order to make adjustments to the process parameters in the event of deviations. This should increase the economic efficiency of the process due to lower reject rates as well as the cell performance. By using a combined sensor system consisting of eddy current sensors (inductive electrical impedance spectroscopy) and ultrasonic transducers, the aim is to be able to monitor a wide range of slurry parameters. This sensor system can be positioned either at the outlet of the mixer or extruder, in the inlet to the coating system or in a feed area with a constant volume flow. Depending on the application, the mechanical dimensions, such as the inner diameter of the measuring tube, or the adaptation to the existing system can be individually adapted. The sensor system is controlled by ultrasonic and eddy current electronics developed at Fraunhofer Institute for Ceramic Technologies und Systems IKTS, which can be designed for different requirements. The conceptual design of the software environment i.e., its adaptation and integration to the requirements of the plant and the process, can be carried out both as a stand-alone measurement system accompanying the process and inline in the form of an NDE4.0 integration. The poster presents this sensor system as well as the results of various measurement campaigns in the field of electrode and battery production.