

COMSOL Simulation of Flash Lamp Annealing for Battery Electrodes Fabrication

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Abstract

Flash lamp annealing (FLA) is a modern annealing technique in the range of milliseconds, which is predestinated for roll-to-roll fabrication of battery electrodes. All-solid-state batteries are the next generation battery concepts that are currently being envisaged among both the international research community and industrial electric vehicle producers. However, the existing methods for a direct temperature measurement, like pyrometry for FLA, are unable to detect background radiation of the intense flash light, emissivity and the shadow effect. COMSOL Multiphysics® is used in order to model thermal cycling of FLA and the temperature distribution through Si/SiO₂/Al_xW_yO_z layers. Furthermore, since on a time scale of only a few ms heat dissipation is dominated by heat conduction towards the substrate, two sample holders of FLA of both steel and quartz are investigated.