Effects of Bulk Density and Inter-particle Contacts on Electrical Resistivity of Calcined Coke Mixes

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Abstract

Packing density of particles is an important factor for a variety of applications of granular materials. In the present work, a three dimensional imaging technique is coupled with the Discrete Element Method (DEM) to model anode grade calcined coke particles. Coke aggregate recipe of industrial pre-baked anodes is modeled with DEM and then the pore size distribution in this packing is numerically measured. Results of the measurements are used to propose a new aggregate recipe. The proposed recipe is examined by its electrical resistivity and packing density. Results show that the proposed recipe holds a better packing density and lower electrical resistivity. It is shown that the inter-particle contact density is lower in the new recipe which results in lower electrical resistivity.

Keywords: Calcined coke, Discrete Element Method, Packing density, Electrical resistivity