Special Issue

Production of Quality Anodes in Aluminum Industry

Message from the Guest Editor

Aluminum is produced commercially based on the Hall–Héroult electrolytic process. Carbon anodes are an integral part of the electrolysis cell as they allow the passage of current and provide the carbon necessary to chemically remove oxygen produced by the electrochemical reaction in the form of carbon dioxide. Since they are consumed regularly, they have to be replaced approximately every three weeks. The quality of carbon anodes has an impact on a large number of operational and environmental issues in a smelter: greenhouse gas emissions, metal purity, energy consumption, stability of cell operation, and production cost. The quality of an anode is defined by its physical, chemical, mechanical, and electrical properties which are affected by raw material and operational parameters: coke and pitch properties which could vary significantly, the quality of recycled carbon materials, the operating conditions of the mixer, the compactor, the baking furnace, and the rodding shop. To maintain and improve the anode quality, studies need to be carried out on all of these issues.

Guest Editor

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Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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