

Effects of Charcoal Addition on the Final Properties of Carbon Anodes

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Abstract

Wood Charcoal is an attractive alternative to petroleum coke in production of carbon anodes for the aluminum smelting process. Calcined petroleum coke is the major component in the anode recipe and its consumption results in a direct greenhouse gases (GHG) footprint for the industry. Charcoal, on the other hand, is considered as a green and abundant source of sulfur-free carbon with a massive worldwide production of more than 50 Mt per annum. Pre-treated charcoal was used to substitute up to 10 % of coke in the anode recipe in an attempt to investigate the effect of this substitution on final anode properties. The results showed deterioration in the anode properties by increasing the charcoal content. However, by adjusting the anode recipe this negative effect can be considerably mitigated, e.g. increasing the pitch content was found to be helpful to improve the physical properties of the anodes containing charcoal.

Keywords: Anodes; charcoal; petroleum coke; specific electrical resistivity; mechanical properties.