Bio-coke for ferroalloys industry production: the influence of charcoal addition to coking blend on mechanical strength of stamped coal cakes

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ABSTRACT

The Polish coke-making industry is the largest European exporter of high-quality coke. Polish coke is mainly used in blast furnaces for the production of pig iron and as a reducing agent in ferroalloy smelting processes in Norwegian smelters. Ferroalloys are enrichment additives for the production of the highest quality steel, including special purpose steel. Norwegian ferroalloy industry produces more than 1 million of tonnes of ferroalloys per year (i.e. FeSi/Si, FeMn/SiMn). Because raw materials of fossil origin (coal and coke) are used as raw materials for ore reduction, the ferroalloy industry is a significant CO_2 emitter, and accounts for approximately 5% of the total industrial CO_2 emissions in Norway. In order to protect the climate and the natural environment, EU countries and others are constantly striving to reduce greenhouse gas emissions, in particular CO_2. One of the greatest Norwegian ferroalloys producers - Eramet Norway have adopted the plan of 43% CO_2 reduction of emission till 2030. To achieve the goal, it is necessary to replace fossil-based reducers with low- or zero-emission reducers of renewable origin.

Therefore, a research project is being carried out to develop an innovative and economically viable technology for bio-coke production for the ferroalloys industry (Mn-alloys). The idea of the implemented project is based on the production of a hybrid reductant with use of coal-biomass blends (partial replacement of non-renewable elemental carbon forming the coke structure with carbon from renewable sources) and verifying its suitability on a pilot scale.

The presentation shows the results of the assessment of the impact of the addition of commercially available charcoal to the coal coking blend on the mechanical strength of stamped coal cakes. The appropriate strength of the coal cake is necessary to insert it into the coke oven chamber and produce coke in the coke oven battery.

KEY WORDS

bio-coke; coke making; stamp charging

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