

Article ID: 1003-7837(2005)02,03-0598-01

Recycling methods of foundry slags

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Too much amount of wastes slags, that produced during the melting and pouring of aluminium, saving by aluminium industry plants in present time. Chemical consist of foundry slag at one of the factories is: (% ,mass fraction) Al-28.74, Al_2O_3 -31.66, SiO_2 -5.66, Fe_2O_3 -2.15, Cl-7.83, CaO-1.36, Cu-0.44, Zn-0.24, MgO-6.63, Na_2O -5.9.

We propose acid and alkali methods for foundry slags recycling. That methods allow to product a different types production -alumina, coagulants for drinking and waste water treatment (aluminium sulphate, aluminium oxochloride), building materials and others.

The acid method consist of foundry slags leaching by 20% - 25% saline acid at 90 - 95°C temperature during 2 hours. After that pulp is filtrating by the vacuum filter. The filtrate used as a coagulant for drinking and waste water treatment. The cake is directing to building material production.

During the leaching of slags by saline acid, much amount of impurities is transferring to the solution. The alkali method of slags treatment was offered for reduce solution contamination. This method is providing foundry slags and alkali solution ($NaOH$ 70 - 80 g/L concentration) interaction at 60 - 80°C temperature during 1.5 hours. Metallic aluminium and part of aluminium oxide are transferring in the solution as sodium aluminate. It may be use for alumina production or active aluminium hydroxide may produce from it by sulphuric acid neutralization. Active aluminium hydroxide is synthesizing aluminium hydroxochloride or hydroxosulphate. Cake consist of 60% Al_2O_3 and its sintering in rotate furnaces at 1100 - 1200°C for aluminium oxide extraction. The alkali method of foundry slags recycling is most acceptable for technological processes of alumina producing by sintering method from high silica bauxite (for example "Boksitogorsky Glinosem").