Development of Alkaline Aluminosilicates Processing Technology

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Abstract

Alkaline aluminosilicates are of significant interest to the metallurgical and chemical industries, and deposits are widespread in countries like Russia, USA, China, Canada, Venezuela, Mexico, Iran, Egypt, Portugal, Spain, Bulgaria. They can present a viable alternative to bauxites. Complex and waste-free alkaline aluminosililcate processing technology to produce alumina, soda ash and cement was developed by VAMI in the 1st half of twentieth century, from idea to successful realization in several Russian facilities. Till now this technology has ensured competitive alumina production costs by processing all raw material elements into commercial products. For alumina production using this technology, the following raw materials are used: nepheline concentrate after apatite extraction from apatite-nepheline ores in the Khibiny mountains at Kola peninsula, and the Kiya Shaltyr nepheline deposit in the Krasnoyarsk region with a uniquely high alumina content (Al_2O_3 26 – 28 %). Other nepheline sources in Russia and other counties are generally of lower quality (Al_2O_3 19-22 %), and their processing results in more cement produced per tonne of alumina. An economically efficient beneficiation technology has been developed that opens the possibility for more efficient industrial processing of comparatively poor aluminosilicate raw materials in Russia and the rest of the world.

Keywords: alkaline aluminosilicates; processing properties; quality, beneficiation.