

Studies on Mineralogy and Beneficiation of REE Ores

J. YANG

GTK Mintec, Tutkijankatu 1, 83500 Outokumpu, FINLAND

Jason.yang@gtk.fi

Currently, the world's REO production is mainly from bastnäsite, monazite, xenotime, and the Chinese ion adsorption ores. As the demands of REE in the world are increasing other REE minerals or resources could become new REO sources in the future such as steenstrupine in Kvanefjeld deposit in Greenland, eudialyte in Norra Kärr deposit in Sweden and Kringlerne deposit in Greenland. Apatite could also be a potential REO source as the by-product in the phosphate ore processing.

Studies on mineralogy and beneficiation of the REE ores from the deposits of Kvanefjeld, Norra Kärr and Kringlerne were conducted at GTK in the EU funded project EURARE. The MLA and EPMA were used for mineralogical analyses and beneficiation laboratory bench testwork and demonstrations in pilot scale were performed. For the Kvanefjeld ore multistage flotation approaches were tested and optimized to separately obtain REE (steenstrupine) and Zn concentrates. For the Norra Kärr and Kringlerne ores wet and dry high intensity magnetic separation techniques were tested and the parameters were optimized for the enrichment of eudialyte efficiently.

In addition, case studies on mineralogy and beneficiation for the ores with complex REE mineralogy from the deposits in Finland, Norway and Mongolia, and the apatite REE ores from the phosphate deposits in Mongolia were carried out in EURARE project and the development cooperation project funded by Finland's Ministry for Foreign Affairs. Based on mineralogical analyses the beneficiation techniques of flotation, gravity concentration, magnetic separation and acid leaching were technically assessed for recovering different types of REE minerals and phases.

References:

Yang, X., et al., 2016. Mineralogy and beneficiation of vein-type apatite REE ore from Mushgia Khudag, Mongolia, In: Ismar Lima and Walter Leal (eds.) Rare Earths Industry Technological, Economic, and Environmental Implications, Elsevier Press (ISBN: 978-0-12-802328-0), pp.377-392.

Yang, X., et al., 2015. Beneficiation studies of a complex REE ores, Minerals Engineering. Vol.71, pp.55-64.

Yang, X., et al., 2015. Challenges in beneficiation of complex REE ores, Conference in Minerals Engineering, 3-4 February 2015, Luleå Sweden, pp.143-154.