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The effects of pre-treatment mechanisms in Bentonite wet processing by hydrocyclone

Harada, J.(1); Nery, G.m.(1); Radina, A.(2); Kahn, H.(1); Valenzuela-diaz, F.R.(3); Machado, G.(1);
(1) USP; (2) UDS; (3) EPUSP;

A sodic bentonite has been evaluated in terms of smectite enrichment efficiency, by applying three different pre-treatment methodologies before passing thought a ceramic hydrocyclone (Ø30mm, 130mm cylindrical section and 155mm conical section), having a nominal cut size of 7 µm operated at 50 psi. Mineral pulps where prepared using the following pre-treatment mechanisms: 1. Natural: only pump blending within the hydrocyclone circuit. 2. Attrition: A high-speed bench attritor was used for 30 min (each 20 lts). 3. Mechanical agitation: Spinning 1 lt bottles half-filled were left for 24 hrs. at 10 rpm. Mineralogical composition derived mainly from XRD´s over the bulk and clay size fraction, revealed that a Fe+rich dioctahedral smectite is the major present phase, having quartz and k-feldspar as accessory minerals and traces of clinoptilolite. Consequently, the aim of this study is to observe how these three very distinctive levels of energy, applied to the bentonite slurry, would affect hydrocyclone classification efficiency when removing mainly Quartz (13%), k-feldspar (8%) others (2%). In order to monitor experimental behaviour as much realistic as possible, samples where immediately analyzed by low angle laser light scattering (LALLS) to obtain the size distribution curve of the underflow, overflow and a blank sample for each experiment. Results show promising trends with respect to the low energy controlled systems, such as the one proposed Spinning bottles half-filled for 1 day. at 10 rpm, that showed a better performance that the other two compared systems.