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Beneficiation of Low Grade Calcium Bentonite Claystone

Abstract- *The beneficiation of Ca-bentonite claystone has been studied with dispersion sedimentation technique using polyionic salts as dispersant. The claystone is located in the Western Desert of Iraq. It is of a low grade, associated with different amount of clay and non-clay mineral impurities. Calcite (CaCO_3) constitutes the major proportion of these impurities. Various parameters; solid concentration, dispersant amount (e.g. sodium tripolyphosphate, and tetrasodium pyrophosphate), conditioning time, and centrifugal sedimentation speed and time on the efficiency of the beneficiation process were investigated and followed through the measurement of $\text{CaO}\%$ and cation exchange capacity (CEC) values of the upgraded claystone concentrate. Centrifugal sedimentation were tested to separate the impurities from the clay suspension. Design experiments by Taguchi method, orthogonal array L16, was used for optimizing the different process parameters of the beneficiation process. Experiments were conducted at different solid concentrations (1, 3, 5, 7) wt.%, dispersion agent amount (0.2, 0.4, 0.6, 0.8) wt.%, conditioning time (5, 10, 15, 20) min, centrifugal sedimentation speed (500, 600, 700, 800) rpm, and centrifugal time (5, 10, 15, 20) min. The optimum beneficiation conditions obtained from the experimental work are, 7 wt.% solid concentration, 0.8 wt.% of dispersant, 15 min conditioning time attachment of the dispersant agent with the bentonite slurry, 800 rpm centrifugal speed, for 10 min time. Under studied condition, tetrasodium pyrophosphate showed better output t for achieving good beneficiation of bentonite clay from dilute crude slurry.*

Keywords- *beneficiation, cation exchange capacity (CEC), centrifugal sedimentation, dispersion, montmorillonite.*

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