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Bentonite-Treatment of Bentonite with Na_2CO_3 and MgO

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Bentonites and their major clay mineral smectites have been important industrial raw materials. Some of the applications are drilling fluids, catalysts, cosmetics, paint and paper. Bentonites are very different because of their different chemical compositions and of the physical state of their constituents. These differences determine various technological applications of bentonites. Bentonites are classified according to their dominant exchangeable interlayer cation. Sodium bentonite may absorb a large amount of water in the interlayer which leads to high swelling degrees with hydration. In this study, bentonite samples from Çankırı region of Türkiye were treated with Na_2CO_3 and MgO . The mass percentages of Na_2CO_3 and MgO were in the range of 1-3. The statistical experimental design method was used for the amounts of chemicals used in the bentonite treatment. Na_2CO_3 and MgO were added to the initially moisturized bentonite samples and kneaded till all the bentonite had reacted with these chemicals. Then, the activated samples were left to drying and curing under sunlight. After activation and drying/curing period for a month, the activated samples were crushed. The resulting materials were analyzed by Infrared (IR) spectroscopy. The analyses showed that structural changes occurred by Na_2CO_3 and MgO treatment. Swelling tests were performed with 2 gram samples. The swelling experiments showed major increases in swelling degrees depending on the compositions of the chemicals added to the bentonite samples. The highest swelling degree observed was 27 ml for the sample with 3 % Na_2CO_3 and 1 % MgO addition.

Biography

Dr. Gündüz has completed her BSc from Middle East Technical University (Türkiye) and her PhD from Iowa State University (USA). She is a full professor in the Chemical Engineering Department of Gazi University. She has published more than 20 papers in reputed journals.

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