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Spectral characterization of Cukurbag-Camardi-Nigde clays (Central Anatolian Region-Turkey) and petroleum exploration

Characterization of Cukurbag-Camardi-Nigde clays in the Central Anatolia region were carried out and results were interpreted in terms of petroleum exploration. The clay samples taken from Cukurbag-Camardi studied area which is located at the southeast of Nigde province were investigated by means of spectroscopic methods. Chemical analyses reveal that the samples chemically consist of SiO_2, TiO_2, $Al2O_3$, $Fe2O_3$, MnO, MgO, CaO, Na_2O, K_2O, Cr_2O_3 and P_2O_5. DTA-TG measurements have been carried out for the determinations of the thermal behaviour of the clay samples. Firstly, the FTIR spectra of the clays known as standard clays such as illite, illite-smectite mixed layer, chlorite (ripidolite), montmorillonite, Ca-montmorillonite, namontmorillonite, nontronite, kaolinite have been taken and then the spectra of illite+quartz+feldspar, quartz+feldspar mineral associations have been taken together with the standard clays. The minerals included in the samples taken from Cukurbag-Camardi study area were identified by comparing their FTIR spectra with those of the standard clay minerals and XRD analysis results. Moreover, to see whether any changes occur or not in the structure of the clay samples which have been undergone to thermal processes, FTIR spectrum of the sample belonging to the lower level has been taken. It has been found that the clay samples have included Na-montmorillonite, chlorite, illite, calcite, feldspar and quartz that silicate has a T-O-T (Tetrahedral-Octahedral-Tetrahedral) smectite structure. In recent years, two of the methods for petroleum exploration, organic maturity and diagenesis of the clay minerals. During the diagenesis and metamorphism, changes in the clay structures due to the temperature will reflect degree of diagenesis and metamorphism. Factors including temperature, pressure, depth and burial that are all influential during these changes along with hydrocarbon formation and the primary migration of the hydrocarbons could be explained through the diagenesis of clay minerals and organic maturation. Required temperatures for these changes in the clay structures are in the same range with the required for petroleum formation (60-150°C). Results acquired by using the organic maturation could be obtained through the spectral studies of the clay mineral structures.

Speaker Biography

Burhan Davarcioglu is currently an associate professor at the Aksaray University, Turkey. He joined as the Engineer graduated from the Physics, Hacettepe University, Ankara-Turkey, faculty of Engineering in 1978. In 2001-2003, he was founding chairman of technical programs division in Nigde University Turkey. In 2010-2012, he became as an head of nuclear physics division; physics department-faculty of science and art, Aksaray University-Turkey. He is an active member in (AIPEA-Scientific Council Member: International Association for the Study of Clays, ATINER-Academic Member Physics Research Unit: Athens Institute for Education and Research, AASCIT - Senior Member: American Association for Science and Technology).

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