

Spectral Characterization of Kolsuz Area (Ulukisla-Nigde) Clays, Central Anatolian Region, Turkey

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The clay samples taken from Ulukisla-Kolsuz studied area taking place in the northeast part of Nigde province in the Central Anatolian Region-Turkey have been investigated by means of spectroscopic methods. Chemical analyses reveal that the samples chemically consist of SiO_2 , TiO_2 , Al_2O_3 , Fe_2O_3 , MnO , MgO , CaO , Na_2O , K_2O , Cr_2O_3 and P_2O_5 . DTA (differential thermal analysis) and TGA (thermogravimetric analysis) measurements have been carried out for the determinations of the thermal behaviour of the clay samples.

Firstly, FT-IR (Fourier transform infrared) spectra of the standard clay minerals - "The World Source Clay Minerals" such as illite (IMt-1; Silver Hill, Montana, USA), illite-smectite mixed layer (ISMt-1; Mancos Shale, Ord.), montmorillonite (SCa-3; Otay, San Diego Country California, USA), Ca-montmorillonite (STx; Gonzales Country, Texas, USA), Na-montmorillonite (SWy-1; Crook Country, Wyoming, USA), kaolinite (KGa-1; Washington Country, Georgia, USA), chlorite (ripidolite, CCa-1; Flagstaff Hill, El Dorato Country, California, USA), palygorskite (PFI; Gadsden Country, Florida, USA) were obtained. Then the spectra of anhydrite, gypsum, illite + quartz + feldspar, quartz + feldspar were recorded together with the standard clays. The minerals included in samples taken from Ulukisla-Kolsuz study area were identified by comparing their FT-IR spectra with those of the standard clay minerals and XRD (X-ray diffractometer) analysis results.

The O-H, Al-Al-OH, and Si-O-Si groups in the FT-IR spectrum were detected for the samples belonging to the lower and upper levels of the Ulukisla-Kolsuz stratigraphic field sections (Kk1) and (Kk3) respectively. To see whether any change occur or not in the structure of the clay samples which have been undergone by thermal process, FT-IR spectrum of the sample (Kk1) belonging to the lower level has been taken. The assignments of the vibration frequencies of this spectrum were carried out following the same way applied the spectra of the other samples. In addition, it has been found that Ulukisla-Kolsuz clay samples have included illite, illite-smectite mixed-layer, Na-montmorillonite, chlorite, palygorskite, calcite, feldspar and quartz that silicate has a T-O-T (Tetrahedral-Octahedral-Tetrahedral) smectite structure.

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