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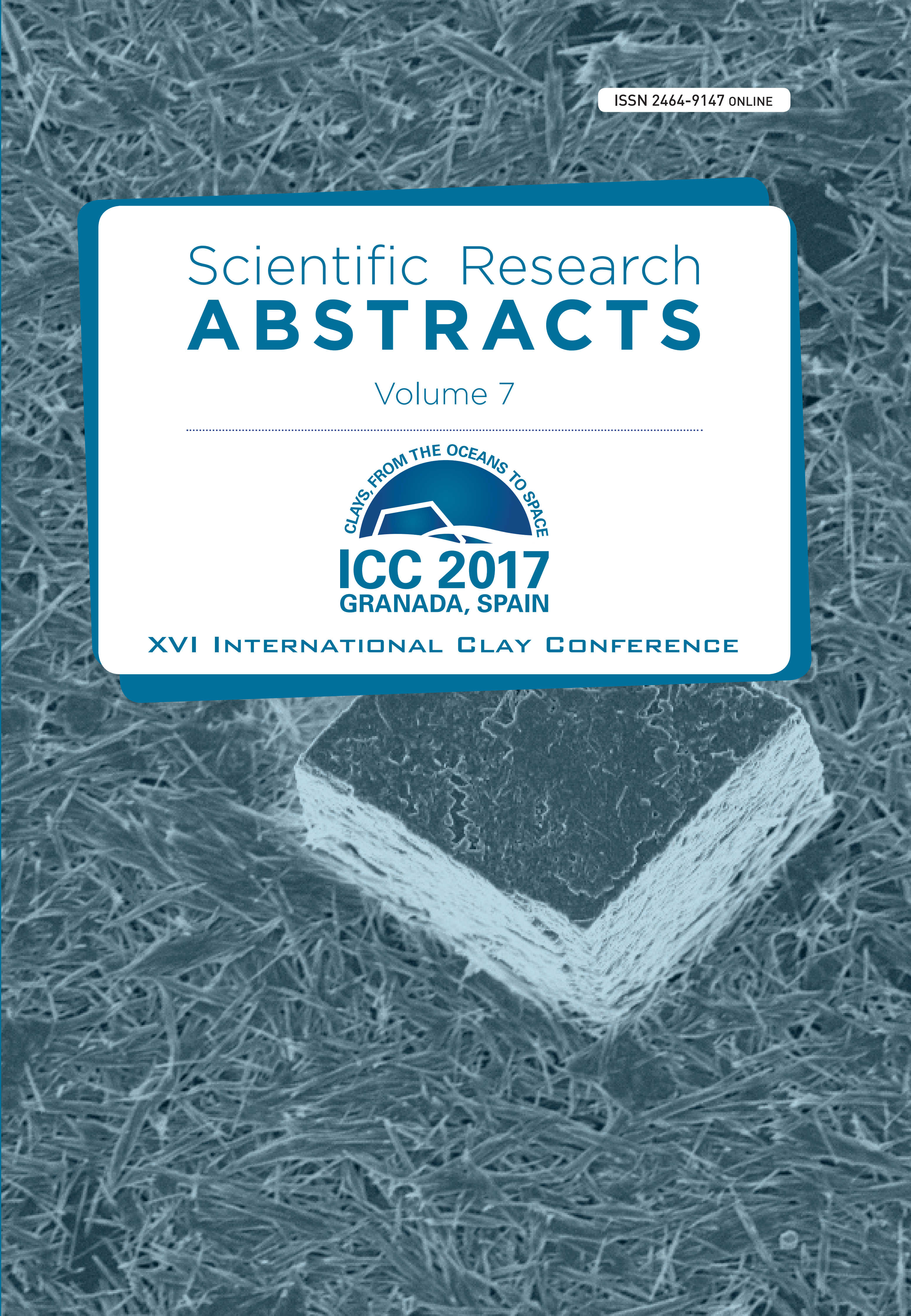

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SYNTHESIS AND STABILIZATION OF MAGNETIC COMPOSITES OF BENTONITE

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Using Elmore's method, nanoparticles of magnetite were synthesized in the structure of bentonite of Tagan deposit (Kazakhstan). Nanoparticles of magnetite were stabilized by polyethylene glycol (PEG) and low molecular weight surfactant oxyethilenic alkylphenol (OP-7). The mass ratio of the magnetite and bentonite was 1:3, and the concentrations of PEG and OP-7 were $0.5 \cdot 10^{-3}$ and $2.5 \cdot 10^{-3}$%, respectively.

Based on the results of electron microscopic studies, the advantage of using PEG as a stabilizer in the synthesis of magnetite in interlayer space of bentonite clays over using low molecular weight surfactant OP-7, which forms a dense adsorption layer on the surface of the mineral, was substantiated.

Using light scattering method on the Zetasizer Nano instrument, dispersion analysis of magnetic clays obtained in the presence of $2.5 \cdot 10^{-5}$% PEG, was conducted. It was established that the particles of individual magnetite have size of 70 nm, bentonite - 505 nm, and the size of the magnetite-bentonite composite is 2150 nm. The presence of PEG reduces the size of the composite up to 1200 nm. Decrease of composite size is caused by the fact that the introduction of the polymer contributes to the convergence of magnetite and bentonite particles due to the formation of hydrogen bonds between its macromolecules, oxygen atoms of silicate groups of bentonite and iron oxides groups of magnetite.

X-ray analysis of magnetic clays was conducted. On the diffraction pattern of bentonite highest peaks were found at values of 2θ=20.780° and 28.980°, which correspond to silicon-oxygen and aluminum-oxygen groups of montmorillonite, contained in the bentonite. In the case of magnetite, the most intense peaks were obtained at values of 2θ of 35.240° and 41.572°, which correspond to the phase Fe_3O_4 and $Fe_2O_3$of magnetite. Changes in the X-ray diffractogram of bentonite were found, which indicate the introduction of magnetite nanoparticles in the bentonite structure.

It was shown that the introduction of magnetite nanoparticles in the interlayer space of bentonite is determined by not only the physical accordance of sizes of magnetite particles and the interlayer space, but also by chemical interactions, which lead to significant changes in the bentonite structure, resulting in appearance of new phases.

Sedimentation stability of dispersions of magnetite and its composites with bentonite was studied. It was shown that the magnetite dispersions are unstable, and suspensions of magnetic composites of bentonite are much more stable. Presence of PEG and OP-7 increases the stability of the suspensions.