

ESR studies of sepiolites

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Abstract: The electron spin resonance (ESR) spectra for each beige and brown sepiolites from Polatlı-Ankara, Turkey, a clay mineral of $\text{Mg}_8\text{Si}_{12}\text{O}_{30}(\text{OH})(4)(\text{OH}_2)(4)(\text{H}_2\text{O})(3)$, at 77 K have their own single characteristic peak at g approximate to 1.99, which begins to anneal from 437 and 536 degrees C, respectively. The sextet lines of Mn^{2+} were also observed in addition to two peaks ($g = 4.4$ and 5.0) associated with Fe^{3+} . A high-quality sepiolite called "meerschaum" from Sepetci-Eskisehir, Turkey, has two characteristic peaks at g approximate to 1.99, which begins to anneal from 419 degrees C, and at g approximate to 2.03. ESR intensities of the signal at g approximate to 1.99 for beige, brown sepiolites and meerschaum are enhanced by gamma-ray irradiation to give equivalent doses $D-E = 11.8 \pm 3.4$, 4.7 ± 2.3 and 4.6 ± 1.2 kGy, respectively. The ESR ages obtained by assessing the annual dose rate from the content of U-238, Th-232 and K-40 determined by gamma-ray spectroscopy are 1.8 ± 0.8 , 0.7 ± 0.5 and 0.9 ± 0.2 Ma, respectively, falling into the Pliocene Epoch in geological time scale in agreement with the stratigraphy.

Key Words Plus: ELECTRON-SPIN-RESONANCE; TI CENTERS; QUARTZ; AL

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