

Raman spectroscopy and X-Ray diffraction of graphite ore, Surian complex

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Abstract: Surian volcano–sedimentary complex located on the eastern edge of the Sanandaj-Sirjan metamorphic zone, southwest Iran. Graphite schist is the most abundant lithological facies in this area. Due to the high grade of the graphite ore (up to 50%), the exploitation of the ore is economically valuable. Gangue minerals include quartz, muscovite, plagioclase, clinocllore, zircon and ilmenite. The occurrence of crystalline graphite with ordered structure is shown by the presence of a first order peak in Raman spectra ($\sim 1587 \text{ cm}^{-1}$ Raman shift) and 3.35 \AA d spacing. A linear relationship between metamorphic temperature and the Raman parameters R_1 and R_2 make graphite an accurate geothermometer. Using this geothermometer gives metamorphic Surian complex temperatures range from 234 to 258 °C, consistent with previous studies that give P-T conditions of green schist to lower amphibolite metamorphic facies.

Keywords: *Graphite; Raman spectra; X-Ray diffraction; geothermometer; metamorphic; Surian complex.*

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