

RAMAN SPECTROSCOPIC INVESTIGATIONS ON LOW-TEMPERATURE METAMORPHIC ROCK SERIES FROM MT. MEDVEDNICA, CROATIA

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Systematic changes in the Raman spectrum of fine-dispersed organic material with increasing metamorphic grade were described by several authors (e.g. YUI et al. 1996; BEYSSAC et al. 2002). They described a shift of the G peak of the spectrum from ca. 1600 cm⁻¹ to 1575 cm⁻¹, a decreasing full width at half maximum of the G and D1 bands (at ca. 1350 cm⁻¹) and a decreasing D1/G peak area ratio with increasing metamorphic grade. BEYSSAC et al. (2002) established an empirical equation in which the peak metamorphic temperature is calculated as a linear function of the D1/(G+D1+D2) (D2: at ca. 1610 cm⁻¹) peak area ratio (R2) with a precision of ±50 °C in the range of 330 °C and 650 °C. Using the empirical data of BEYSSAC et al. (2002), RANTITSCH et al. (2004) published reliable temperature estimates for the Greywacke Zone.

The aim of this work is to provide additional data on the diagenetic–low-temperature metamorphic evolution of the Eoalpine (Palaeozoic–Mesozoic) complex, the Jurassic ophiolitic mélange and Late Cretaceous–Palaeocene sequence in Mt. Medvednica, Croatia (PAMIC & TOMLJENOVIC 1998). For this purpose, Raman data were correlated with vitrinite reflectance values, the X-ray powder diffraction-based characterisation the fine-dispersed carbonaceous material and with metamorphic grade-indicating parameters of mineral phases (e.g. illite Kübler and chlorite Árkai indices, apparent mean crystallite thickness and lattice strain and results of chlorite empirical Al(IV) geothermometers; JUDIK et al. 2004). A fairly good correlation was obtained between the temperature estimates using empirical inorganic and organic “thermometers” For metapelitic samples from the Eoalpine (Palaeozoic–Mesozoic) complex temperatures were estimated at ca. 350-450 °C. Temperatures in the Jurassic ophiolitic mélange range between 200-250 °C. The Late Cretaceous–Palaeocene sequence is characterised by peak temperatures below 200 °C.

References

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