

## **OVERPRESSURED COESITE INCLUSIONS IN ZIRCON AND GARNET: EVIDENCE FROM LASER RAMAN MICROSCOPY**

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Coesite occurs as inclusions in mechanically strong minerals in deeply subducted, metamorphosed crustal rocks in a number of Eurasian collisional orogens. It is the primary indicator mineral of ultra-high pressure metamorphism (UHPM). Whereas some coesite inclusions are untransformed, most exhibit partial transformation to palisade quartz and a concomitant increase in volume (resulting in rupture and radial fracturing of the host grain). Coesite can be identified by its diagnostic Raman spectrum; the strongest band (at atmospheric pressure, room temperature) is at 521  $\text{cm}^{-1}$ . Laser Raman microspectroscopic analyses of coesite inclusions within garnet and zircon in UHPM rocks from Kazakhstan, Indonesia and China reveal consistent differences in the Raman spectra of [1] partially transformed coesite + quartz (main Raman band at 521  $\text{cm}^{-1}$ ) and [2] untransformed monomineralic coesite grains (main band at 525-526  $\text{cm}^{-1}$ ). Applying the room-temperature calibration of pressure dependence of the coesite Raman spectrum, we conclude that the latter coesite inclusions are subject to a remarkable pressure differential of 19-23 kbar with the host grains, and are still experiencing P-T conditions on or close to the quartz-coesite equilibrium boundary.