IS UHPM DIAMOND ABNORMAL?

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With respect to normal diamond, the Raman band of diamond at Kokchetav, Kazakhstan (SMITH et al., 2004) and at Straumen, Norway (GODARD et al., 2003) is weaker, wider and downshifted from 1332 cm^{-1} to values between 1329 and 1323 cm^{-1}. Several non-exclusive hypotheses (cf. SMITH et al., 2004) are re-discussed with reference to new data from a lonsdaleite standard and from Kokchetav: (a) transformation into another polymorph of carbon, notably lonsdaleite which shows a weak, wide band at ~1328 cm^{-1}; defects caused by (b) plastic deformation, (c) temperature effects, (d) radiation damage, (e) abundant nanometric oxide inclusions, (f) impurities such as B, N & P, or (g) other growth features. These abnormal diamonds are usually intimately associated with retrograde graphite (Fig. 1).

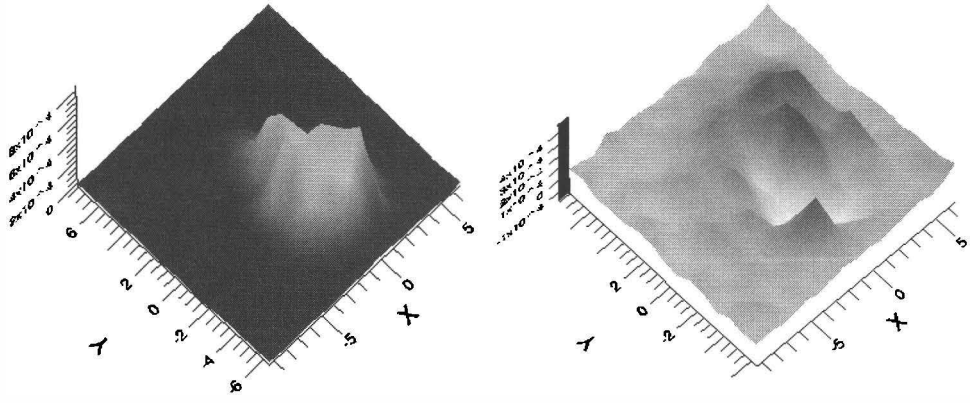

Fig. 1. Raman peak intensity maps of a micron-sized carbon inclusion in metamictised zircon (Kokchetav, sample K210-LD): [left]: diamond, only in the core (lighter); [right]: graphite surrounding the diamond (darker).

References

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