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# RAMAN BAROMETRY OF MINERAL INCLUSIONS IN DIAMOND CRYSTALS

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Inclusions of high-pressure minerals trapped inside diamond crystals may provide valuable information about the conditions under which their diamond host was formed. A "minimum value" for the pressure in the source region is determined through the estimation of fossilised pressures of inclusions. Note that the observed pressure will always be lower than the formation pressure, especially if pressure has been released partially through the formation of fractures in the diamond host (Fig. 1). Such remnant pressures can be determined *in situ* from shifts of vibrational modes. The application of this technique to an inclusion, however, requires the availability of a precise pressure-calibration of band shifts, which are for instance determined in diamond anvil experiments, for the respective phase. The remnant pressure on included minerals for which such pressure-calibration has not been done can nevertheless be estimated. Raman maps of the diamond LO=TO mode reveal not only the strain distribution in the host diamond (NASDALA et al., 2003) but can also be used to locate the diamond micro-area with the strongest compression and, with that, the highest preserved pressure.

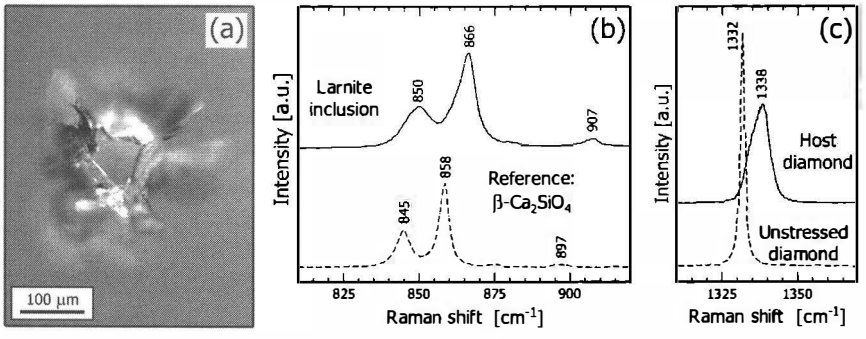


*Fig. 1. The Raman spectrum of a larnite inclusion (a) inside a large diamond crystal from the Kankan district, Guinea, is shifted with respect to that of unpressurised β-$Ca_2SiO_4$ (b) due to significant remnant pressure acting on the inclusion. The fossilised pressure can be determined from the frequency of the LO=TO mode of the neighbouring diamond host. An up-shift of ~6 $\Delta cm^{-1}$ (c) corresponds to ~2.7 GPa (e.g., HANFLAND et al., 1985)*

**References**

HANFLAND, M., SYASSEN, K., FAHY, S., LOUIE, S.G. & COHEN, M.L. (1985): Phys. Rev. B, **31**: 6896-6899.

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