*American Mineralogist, Volume 90, pages 745–748, 2005*

LETTER

# Growth zoning and strain patterns inside diamond crystals as revealed by Raman maps

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## ABSTRACT

The Raman mapping technique provides a non-destructive means of studying internal growth textures and other micro-structural heterogeneity inside diamond single-crystals. Raman maps showing distribution patterns of the bandwidth (FWHM) of the main first-order lattice vibration of diamond ($LO$=$TO$ phonon at ~1332 $cm^{-1}$) along two-dimensional planes inside diamond crystals may reveal the internal growth zoning of these crystals. The observed zoning is affected, and in some cases even obscured in micro-areas adjacent to inclusions, by patterns of heterogeneous strain in the diamond. We present Raman maps obtained from diamond crystals containing large, single-crystal graphite inclusions, from the Panda kimberlite, Ekati Diamond Mine, Canada. The diamond growth texture was always found to start from the graphite inclusion. This result implies that graphite must have been the primary phase and was overgrown by diamond, whereas syngenetic growth of diamond and graphite was unlikely.