High resolution FTIR mapping of natural diamonds

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In the past, diamonds have been studied by Fourier Transform Infrared Spectroscopy (FTIR) using single point analyses or line scans. However, it has been recognised that many diamonds are intricately zoned in terms of nitrogen concentration and the associated defects. As a consequence, high resolution mapping provides a much more comprehensive insight into the growth histories of natural diamonds (e.g. [1]). FTIR maps of a range of diamonds, consisting of ~103 spectra each, were obtained using a Nicolet iN10 MX FTIR spectrometer. Processing of such large datasets requires specialised software. Hence, a program for spectral deconvolution was devised using Python 2.7.6 and the NumPy and SciPy [2] packages. The program allows in-depth analysis of the nitrogen aggregation state, the hydrogen related 3107 cm-1 and the ~1360 cm-1 platelet peak (fig. 1). This will form the basis for the development of a new thermochronometer using platelet degradation.

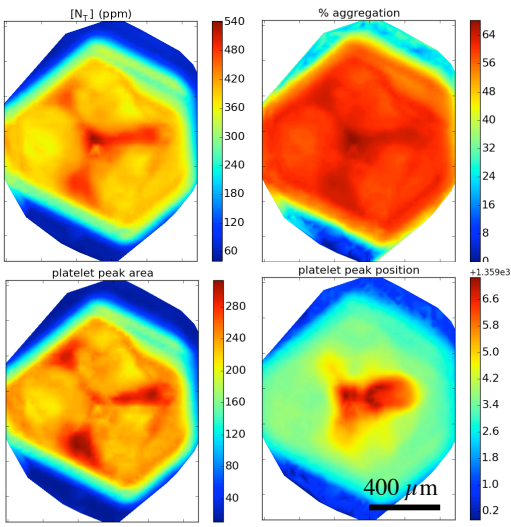

Fig. 1: High resolution FTIR maps of diamond Sese K 1.58.8 (Zimbabwe, reprocessed data from [3]).

[1] Howell et al. (2012), *Diam. Relat. Mat.* **29**, 29-36. [2] Jones et al. (2001-2015), *http://www.scipy.org*. [3] Whittenbury (2014), *unpubl. M.Sci. diss.*, Univ. of Bristol