Table 2 The pressure dependencies of five zero phonon absorption lines found in diamonds, in the range 0–30 kbar

Energy of absorption line (eV)	1·673	2·087	2·464	2·497	2·987
Wavelength of absorption line (nm)	741·0	594·0	503·2	496·5	415·2
Hydrostatic shift (10^{-4} eV kbar^{-1})	$0·4 \pm 0·3$	$6·5 \pm 0·1$	$3·9 \pm 0·1$	$3·9 \pm 0·4$	$1·8 \pm 0·4$

The pressure dependencies of five zero phonon lines in diamond have been measured at 130 K in the pressure range 0–30 kbar and the results are summarized in table 2. The half-widths of these lines are of the order of 0·01 eV. Detailed discussion of these results will appear elsewhere. Measurements have been made also on an absorption band at 3·19 eV in lithium iodide at 150 K, (in this case the halfwidth is about 0·7 eV at 295 K) giving a linear energy shift in the range 0–19 kbar, $(\partial E/\partial p)_{150K} = 0·013 \pm 0·001$ eV. The apparatus is also suited to the measurement of the effects of hydrostatic pressure on the energies of fluorescence emission and Raman scattering excited by laser radiation.

6 Summary

It has been shown that a tetrahedral anvil apparatus can be modified with relative ease to allow optical experiments to be carried out on large samples at temperatures down to about 100 K and at pressures in the range 0–50 kbar. Pressure calibrations differ when the design of the pyrophyllite tetrahedron are not the same, but are consistent in different runs using the same arrangements. Phase transitions appear to be very well defined, indicating that the hydrostatic pressure in the alkali halide medium is reasonably homogeneous. The fact that the various methods of pressure calibration are consistent also support this view.

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