

High Pressure Studies of Molecular Systems at the ESRF

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High-pressure has been shown to be a powerful tool for the study of polymorphism in molecular systems, and the effect of pressure on soft organic systems is an area of great current scientific interest (Boldyreva [1], Oswald *et al.* [2]). Most of the research performed at the high-pressure beamline at the ESRF (ID30/ID27), however, has been confined to characterization of hard materials. Recent studies by Fourme *et al.* [3] have successfully used ID30 to probe the effects of pressure on biological systems. The study of small molecules at high pressure acts as an ideal bridge between these two very different areas of research.

This paper describes structural studies of molecular systems performed at the ESRF on ID27. Gas-driven membrane diamond anvil cells (mDAC) were used to perform the experiments at high pressure and high temperature. The facilities available to the user at ID27 allow both single-crystal and powder diffraction to be used. This is a great advantage for the study of molecular solids since many of these systems undergo destructive phase transitions. The ability change collection strategy from single crystal diffraction studies to powder studies whilst the sample is still *in situ* allows the user to continue the study to higher pressure despite the deterioration of the crystal.

[1] Boldyreva E.V., *J. Mol. Struct.*, 2004, **700**, 151. [2] Oswald I.D.H., Allan D.R., Day G.M., Motherwell W.D.S, Parsons S., *Cryst. Growth & Des.*, 2005, *in press*. [3] Fourme R., Kahn R., Mezouar M., Girard E., Hoerentrup C., Prangé T., Ascone I., *J. Synchrotron Rad.*, 2001, **8**, 1149.

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