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X-Ray reflectometery on the SAXS/WAXS beamline

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X-ray (XRR) and Neutron Reflectometry (NR) techniques are vital and widely used for characterising the interfacial structure of thin films normal to a surface. XRR is regularly used to characterise systems such as ion distribution at the ionic-liquid/electrode surface, the structure of thin film organic photovoltaics, the structure of organic light emitting devices, phospholipid membranes at the air-liquid interface, etc.
XRR measurement are simple in principle: the intensity of reflected radiation is measured as a function of the momentum transfer, Q, which depends on the angle of incidence and the wavelength of the X-rays. Dividing by the direct beam intensity gives the reflectivity. Providing one has sufficient incident beam collimation these experiments can be performed on a lab-source x-ray diffractometer/reflectometer.
The energy of most lab sources (typically CuKα) restricts the choice for the upper medium, usually to air. Therefore air/solid or air/liquid interfaces are studied but rarely solid/liquid, liquid/liquid or buried interfaces. XRR at a synchrotron, where the energy can be tuned allied with the high brilliance, enables one to overcome these limitations. We have undertaken experiments at the liquid/solid interface on the SAXS/WAXS beamline using x-ray energies of 20 keV.
This presentation will outline the progress that has been made with the expectation that this technique will be available to the wider user community. The success with organic solar cell dyes studied at the titania/acetonitrile interface will be highlighted.

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Summary

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