

MS40-P04 | A LABORATORY RHEO-SAXS SETUP - RELATING NANOSTRUCTURE TO MACROSCOPIC PROPERTIES IN ONE GO

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Material research in all its complexity continuously calls for new analysis solutions to solve sophisticated issues in one go.

Relating the nanostructure of a material to its macroscopic mechanical properties requires *in-situ* characterization techniques such as rheology combined with SAXS. Rheo-SAXS experiments have so far been conducted only at synchrotron beam lines, mainly due to insufficient X-ray flux of laboratory X-ray sources and the lack of dedicated Rheo-SAXS laboratory instrumentation.

Anton Paar presents a novel experimental set-up for performing simultaneous Rheo-SAXS studies with the SAXSpoint 2.0 laboratory SAXS system in one go.

The integrated Rheo-SAXS sample stage enables temperature-controlled rheological experiments with in-situ determination of shear-induced structural changes of nanostructured materials on a nanoscopic length scale (from approx. 1 nm to 200 nm) by small-angle X-ray scattering.

The Rheo-SAXS unit includes a rheological sample compartment which is integrated in the evacuated SAXS measurement chamber. The rheometer measuring head comprises a high-precision air-bearing motor which holds and controls the rheological scattering measuring system in the SAXS instrument chamber.

We present combined rheology-SAXS studies of colloidal systems for investigating shear-induced structural changes at the nanometer level which were performed with this novel and optimized Rheo-SAXS laboratory set-up.