1st Workshop for the Extreme Conditions Beamline at PETRA III



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Plastic properties of mineral at high-pressure and temperatures

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In the last few years, a new experimental technique was designed to study the plastic properties of materials under high pressure in the diamond anvil cell. In those experiments, a polycrystalline sample is deformed between the two diamond anvils. Stress and lattice preferred orientations are then studied using diffraction in a radial geometry (i.e. with the incoming x-ray beam perpendicular to the load axis).

Those measurements are then compared with results of self-consistent elasto- and visco-plastic calculations in order to identify and constrain the plastic deformation mechanisms activated in the sample.

In this presentation, I will illustrate the technique and the results obtained with recent experiments and calculations. I will also describe new technical developments that allow us to perform experiments at temperatures on the order of 1200K.

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