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Deforming quartz in a hydrothermal diamond-anvil cell

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We aim at experimentally deforming quartz in the presence of water at high P-T conditions in an ETH-manufactured hydrothermal diamond-anvil cell (Miletich et al. 2000). Creep experiments (approximately constant load) will be carried out on disk-shaped quartz single crystals (~200 μm diameter; ~50 μm high) at a temperature of 800°C and a confining pressure of 1500 MPa. Samples will be loaded parallel to the disk axis. An optical access hole in the diamond support platens allows monitoring the deformation of the quartz *in situ* with an optical microscope. Under the given experimental conditions, quartz may be deformed macroscopically ductile if the differential stress is low enough (typically 10-500 MPa) by either dislocation creep and/or a combination of solution transfer creep and stress corrosion microcracking (e.g., den Brok and Spiers 1991). The evolution of the microstructure with ongoing deformation will be recorded to gain insight into the active deformation mechanisms. We also aim at investigating the possible uptake of water by the quartz crystals (at 800°C and 1500 MPa) by *in-situ* FTIR and/or Raman analysis. Our poster will present the experimental procedures and first results.

References:

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