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Flexible sample environment for high resolution neutron imaging at high temperatures in controlled atmosphere - DTU Orbit (08/11/2017)

Flexible sample environment for high resolution neutron imaging at high temperatures in controlled atmosphere

High material penetration by neutrons allows for experiments using sophisticated sample environments providing complex conditions. Thus, neutron imaging holds potential for performing in situ nondestructive measurements on large samples or even full technological systems, which are not possible with any other technique. This paper presents a new sample environment for in situ high resolution neutron imaging experiments at temperatures from room temperature up to 1100 ◦C and/or using controllable flow of reactive atmospheres. The design also offers the possibility to directly combine imaging with diffraction measurements. Design, special features, and specification of the furnace are described. In addition, examples of experiments successfully performed at various neutron facilities with the furnace, as well as examples of possible applications are presented. This covers a broad field of research from fundamental to technological investigations of various types of materials and components. © 2015 AIP Publishing LLC.

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