Experimental report

22/03/2019

Proposal: INTER-324 **Council:** 4/2016

Title: Trial experiment using heatable TiZr pressure cell for Italian Neutron School

Research area:

This proposal is a new proposal

Main proposer: **Burkhard ANNIGHOFER**

Experimental team: Burkhard ANNIGHOFER
Philip Stephen SALMON
Annalisa POLIDORI
Giulia RAIMONDI
Valentina PATITUCCI
Emanuele PARENTE
Vincenzo DE MICHELE
Michele CAROSSO

Local contacts: Henry FISCHER

Samples: Water (H2O and D2O)

Instrument	Requested days	Allocated days	From	To
D4	4	4	16/06/2016	20/06/2016

Abstract:

Trial experiment using heatable Ti-Zr pressure cell for the Italian Neutron School

Results from this experiment are published in the following: -

Annighöfer B, Polidori A, Zeidler A, Fischer H E and Salmon P S "High-pressure neutron diffraction apparatus for investigating the structure of liquids under hydrothermal conditions" 2017 *High Press. Res.* **37** 529-544.
DOI: 10.1080/08957959.2017.1391953

Abstract: -

A high-pressure setup is described for making neutron diffraction experiments on liquids under hydrothermal conditions. Designs are given for a modified Bridgman unsupported area seal, a fluid separator that keeps apart the liquid sample and pressurising fluid, and a pressure-cell made from the null-scattering alloy $Ti_{0.676}Zr_{0.324}$. Special attention is paid to the choice of construction materials used to avoid corrosion by the liquid sample under load at elevated temperatures. The apparatus is used to investigate the structure of heavy water at pressures up to 2 kbar and temperatures up to 250°C.