ESRF	**Experiment title:** Local structure in FeNi melts at extreme pressure and temperature	**Experiment number**: HC1043
Beamline: ID24	**Date of experiment**: from:27/11/2013 to: 03/12/2013	**Date of report**: 26/02/2015
Shifts: 10	**Local contact(s)**: Innokenty Kantor	*Received at ESRF:*

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Report:

We report here first EXAFS measurement of molten pure nickel at the Ni K edge (8333 eV) performed on beamline ID24 using the recently available laser heating station for measurement in high pressure and high temperature in the diamond anvil cell.

Foil samples were loaded in the diamond anvil cell and embedded in KCl salt for proper isolation. The ruby fluorescence technique was used to evaluate the pressure in the DAC. The samples were heated using a double sided YAG laser and temperature was measured on both sides simultaneously by in-situ pirometry.
The samples were precompressed at 7, 20, 47, 66 and 73 GPa and then heated up to well above the melting (3000-4000 K).
In the xanes, drastic and sharp changes were observed indicating the melting (Fig.1 left panel) and the EXAFS range could be collected up to 8600 eV (Fig1. Right panel).

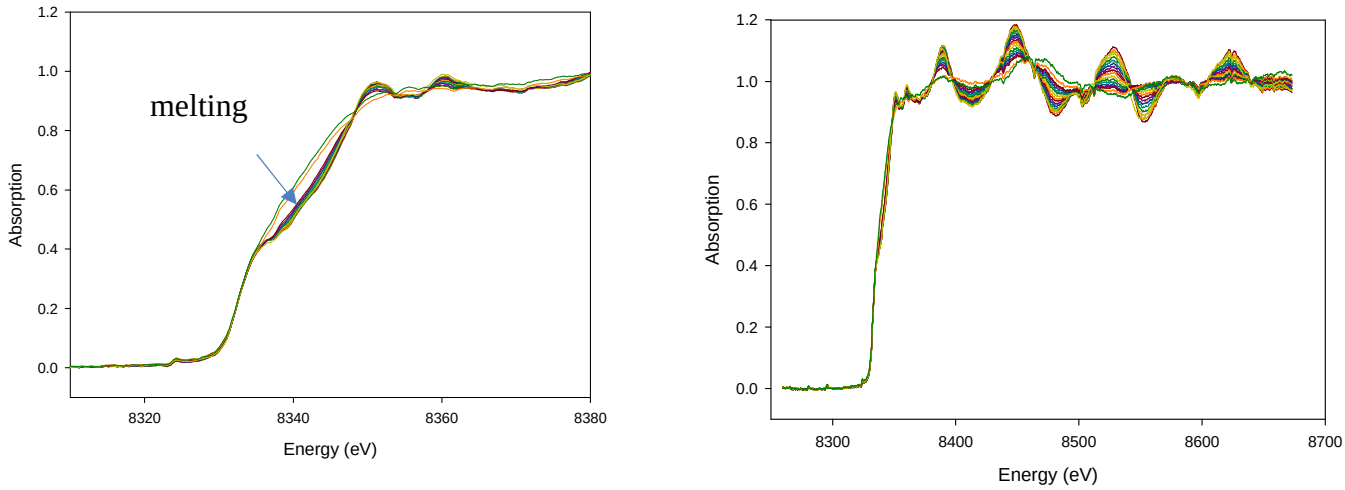

Fig.1: XANES and EXAFS data at 66 GPa at temperatures up to 3000K.

A frequency decrease is observed in the EXAFS oscillations (Fig.2 left panel) and contraction and asymetrization of the first shell is observed in the Fourier transform (Fig.2 right panel) together with disappearance of the second and following shells at the melting.

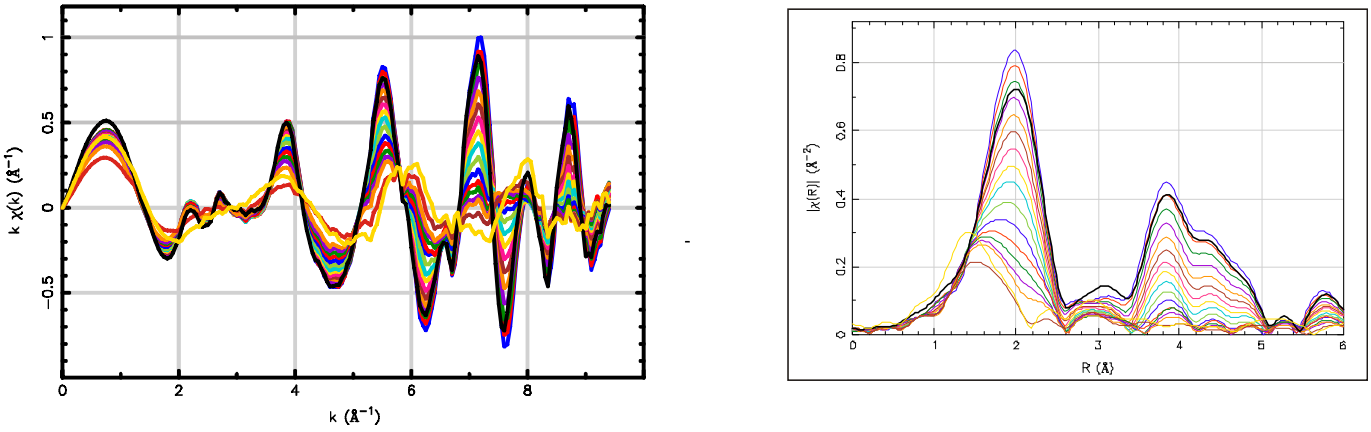

Fig.2: extracted kχ(K) signals (left panel) and Fourier transforms at temperatires up to 3000K

A preliminary analysis of these data show that the melting points detected by the XANES changes are in very good agreement with the literature data. (Fig.3)

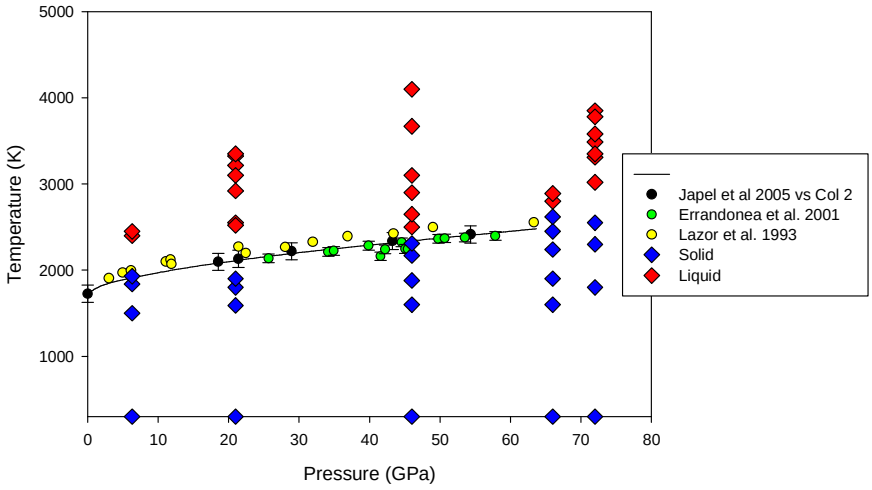

Fig.3: Our melting data in comparison with previous data from the literature

A more quantitative analysis of the local structure of the molten phase in currently ongoing.