
Nuclear resonant x-ray scattering studies under high pressure: The case for ^{57}Fe , ^{119}Sn , ^{151}Eu , and ^{161}Dy metal and their compounds

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Abstract

Nuclear resonant scattering (NRS) and inelastic x-ray scattering (IXS) studies under pressure is conducted at three different beamlines at the Advanced Photon Source. Phase transitions associated with structure, magnetism, spin and valence can be studied in detail using Synchrotron M'ossbauer Spectroscopy (SMS). Key thermoelastic properties such as sound velocity, phonon density of states, vibrational entropy and specific heat, and force constant can be measured using nuclear resonant inelastic x-ray scattering (NRIXS).

We will present new results on iron, tin, europium and dysprosium based nuclear resonant studies, including isotope fractionation measurements in iron and tin compounds, and kinetics of phase transformations under varying temperature and pressure in iron. We will highlight the use of APS Hybrid fill mode for high precision Synchrotron M'ossbauer Spectroscopy.

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