Abstract Submitted
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In-situ x-ray diffraction, electrical resistivity and thermal conductivity measurements using a Paris-Edinburgh cell JASON BAKER, HiPSEC, University of Nevada, Las Vegas and Los Alamos National Laboratory, RAVHI KUMAR, HiPSEC, University of Nevada, Las Vegas, NENAD VELISAVLJEVIC, Los Alamos National Laboratory, CHANGYONG PARK, CURTIS KENNEY-BENSON, YOSHIO KONO, HPCAT, Geophysical Laboratory, Carnegie Institution of Washington, ANDREW CORNELIUS, HiPSEC, University of Nevada, Las Vegas, HIPSEC TEAM, LOS ALAMOS NATIONAL LABORATORY COLLABORATION, HPCAT TEAM — We have designed a special sample cell assembly for simultaneous and in-situ x-ray diffraction, electrical resistance, and thermal conductivity measurements with Paris-Edinburgh type large volume press. Initial measurements have been performed on bismuth (Bi) to up to 7 GPa and 1000°C. Using Bi, which has a number of well-investigated solid-solid and solid-melt transitions, we have been able to demonstrate the feasibility of performing in-situ measurements and correlating the measured electrical-thermal-structural properties over a broad range of P-T conditions. The goal of developing this new multi-probe measurement capability is to further improve detection of the onset of solid-solid/melt transitions, relate structural and electrical properties of materials, determine changes in thermal conductivity at high P-T, and ultimately extend the technique for investigating other parameters, such as the Seebeck coefficient of thermoelectric materials.

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