Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

High-pressure Phase Transition of Hexagonal Silver Sulfide Nano Platelets RAN LIU, BINGBING LIU, QUANJUN LI, MINGGUANG YAO, BO LIU, HANG LV, SHUANGCHEN LU, State Key Lab of Superhard Materials, Jilin University, JING LIU, Institute of High Energy Physics, Beijing, China, DONGMEI LI, BO ZOU, TIAN CUI, State Key Lab of Superhard Materials, Jilin University — Silver sulfide (Ag2S) is a narrow band gap semiconducto. Due to the excellent photoelectric and thermoelectric properties, silver sulfide has been widely used in the field of photocell, photoconductive devices and infrared detectors. Recent years, the discovery of fast ionic conductivity of silver sulfide at high temperature, making it became the research focus once again. Previous studies is limited to the temperature-induced phase transitions, the study of pressure-induced phase transition has not been reported. In order to study the pressure-induced phase transition properties of silver sulfide, the high-pressure synchrotron radiation XRD study on hexagonal silver sulfide nanoplates was carried out. Silver sulfide sample was in the morphology of regular hexagonal nanoplate, with an average diameter of 20nm. High-pressure synchrotron radiation XRD experiments shows that, under high-pressure, the diffraction peaks of silver sulfide are broadening. When the pressure reaches 12.4GPa, the sample transformed into amorphous state gradually and kept the amorphous state until the end of experiment, the highest attainable pressure was 29.4GPa. After the sample quenched to the initial pressure, it returned to the initial monoclinic α-Ag2S phase, phase transformation was reversible.

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Date submitted: 25 Feb 2013 Electronic form version 1.4