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High Pressure Raman and X-ray diffraction studies on MoS_2 up to 51 GPa JASON BAKER, RAVHI KUMAR, NIRUP BANDARU, DANIEL ANTONIO, RAMA VENKAT, THOMAS HARTMANN, DANIEL SNEED, YUSHENG ZHAO, University of Nevada, Las Vegas — Molybdenum disulphide (MoS_2) is technologically important material which finds potential applications as high temperature lubricant, universal joint in ultra high vacuum chambers and in photovoltaic devices. Recent studies show excellent antishock or shock-absorbing property under very high shock wave pressures of 25 GPa and temperature up to 1,000°C. We have investigated the structural stability of MoS_2 under high pressure conditions up to 51 GPa using synchrotron x-ray diffraction (XRD) in an angle dispersive geometry and a diamond anvil cell using Ne pressure medium. Raman spectra were collected up to 30 GPa. Furthermore, we have also performed high temperature x-ray diffraction up to 450°C at ambient pressure conditions. Analysis of both XRD and Raman data indicate a pressure induced phase transition occurring above 20 GPa from the ambient hexagonal to a possible high pressure orthorhombic phase. The results will be presented in detail.

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