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In-situ optical characterization in large volume presses using fibers and diamond anvil assembly AMARTYA SENGUPTA, Institute for Shock Physics, Washington State University, CHOONG-SHIK YOO, Institute for Shock Physics and Dept of Chemistry, Washington State University — Recent advances in high-pressure technologies and in-situ laser spectroscopic and synchrotron x-ray probes lead to unprecedented opportunities of discovering new materials with advanced properties at extreme conditions. Yet, the use of such novel materials has been limited because of either a minute amount ($\sim$ng) of samples in DAC or the absence of in-situ optical characterization systems in large volume presses. Here, we report a unique optical window design based on (a) WC diamond anvil assembly and (b) sintered diamond (SD) diamond anvil assembly inside the PEC which allows optical access to the sample chamber for laser heating and Raman spectroscopy measurements. The optical signal recovery system is a hybrid design consisting of both fibers and free space optics for studying gravity related effects on crystal growth conditions. We have demonstrated the performance of the optical instrumentation and the diamond anvil assembly arrangement by in-situ Raman investigations of the phase transformations in Nitrogen and Carbon Dioxide upto 15 GPa.

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