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Optical Properties measurements of Metals under shock compression using in-situ Ellipsometry NOAZ NISSIM, Soreq NRC, LIOR BAKSHI, Ben Gurion University, SHALOM ELIEZER, GABRIEL APPLBAUM, LIOR PERELMUTTER, Soreq NRC, MICHAEL MOND, Ben Gurion University — The study of the optical properties of materials at high pressure is a novel subject of research, and can be related to the knowledge of equation of state. The optical properties of materials are related to the electronic and structural properties of materials. Therefore, changes of the material optical properties can be used to detect phase transitions. The capability to measure optical properties and to detect phase transitions during a dynamic process is of great importance. Ellipsometry measures the change in the polarization of a probe beam reflected from a surface. From the change in polarization, the complex index of refraction can be extracted. Dynamic ellipsometry measurement system allows to measure all four stokes parameters and to derived the time dependent complex index of refraction. The dynamic ellipsometry was integrated with the gas gun facility for optical properties measurements under planer impact. The optical properties of 1020 steel and tin targets under different impact pressure were measured. The unique characteristics and changes of the optical properties of metals due to impact and heating experiments will be presented.

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