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Shock-wave study of the metallization of alkali halides up to 5 Mbar ORIANNA BALL, R. STEWART MCWILLIAMS, School of Physics and Astronomy and Centre for Science at Extreme Conditions, University of Edinburgh, SUZANNE ALI, JON EGGERT, Lawrence Livermore National Laboratory (LLNL), GILBERT W. COLLINS, Department of Mechanical Engineering, Physics and Astronomy and Laboratory for Laser Energetics, University of Rochester, MATT DIAMOND, RAYMOND JEANLOZ, Department of Earth and Planetary Science and Department of Astronomy, University of California, Berkeley — Alkali halides are of fundamental interest to the shock wave community, for the number of fundamental phase transformations they exhibit under compression. However, the phase transition from wide band gap insulator into electrical conductor, observed in many insulators under shock and static compression (e.g in diamond [1] and quartz [2]) has been poorly explored for the alkali halides. Meanwhile legacy results of Russian experiments pose a number of unresolved questions such as the possibility of nonequilibrium behavior at Mbar shock pressures. In this study we investigate the optical properties of alkali halides, NaCl, KBr, CsBr and CsI, under shock loading up to 5 Mbar, by measuring shock wave speed and reflectivity using line VISAR in decaying-shock experiments. Significant increases in the optical reflectivity in all four cases indicate conditions of metallization at high pressures. The results are analyzed with respect to previous shock and dynamic measurements for the alkali halides. [1] Bradley, D.K., et al., Physical Review Letters, 2004. 93(19): p. 195506. [2] Hicks, D.G., et al., Physical Review Letters, 2006. 97(2): p. 025502.

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