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Room-Temperature Magneto-Optical Phenomena in Organo-Metal Halide Perovskites. TING WU, YU-CHE HSIAO, MINGXING LI, Department of Materials Science and Engineering, University of Tennessee, Knoxville, Tennessee, 37996, USA, NAM-GOO KANG, JIMMY MAYS, Department of Chemistry, University of Tennessee, Knoxville, Tennessee, 37996, USA, BIN HU, Department of Materials Science and Engineering, University of Tennessee, Knoxville, Tennessee, 37996, USA — Organo-metal halide perovskites have become extremely interesting light-emitting, photovoltaic and lasing materials. The first magneto-optical phenomena, namely magneto-absorption effects, were reported in 1994 for very low temperature and high field (20 Tesla). Here, we report room-temperature magneto-optical phenomena at low field (<200 mT) from such perovskites. We find that room-temperature magneto-optical effects require high excitation intensity. At high excitation intensities we can observe magnetic field effects on photoluminescence, photocurrent, and electroluminescence. The magneto-optical phenomena indicate that both light-emitting and photovoltaic responses undergo a spin-dependent process. Furthermore, at low excitation intensities organo-metal halide perovskites exhibit negligible magnetic field effects. Therefore, we can conclude that the magneto-optical phenomena are from spin-dependent charge recombination in light-emitting and photovoltaic processes. This presents a new mechanism to control the light-emitting and photovoltaic functions in organo-metal halide perovskites by using spins. This presentation will discuss the key parameters in controlling magneto-optical phenomena in organo-metal halide perovskites.

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