Third order nonlinear optical properties of organometal halide perovskite by means of the Z-scan technique

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The nonlinear optical response of CH3NH3PbBr3 perovskites is investigated using Z-scan technique, employing 10 ns laser pulses, at 532 nm. The systems were found to exhibit strong nonlinear optical response, dominated by nonlinear refraction. The effect of organic and inorganic composition ratio on the nonlinear susceptibility is studied experimentally. In all cases, the nonlinear absorption and refraction have been determined. The corresponding third-order susceptibilities and second-order hyperpolarizability are determined to be as large as 10−6 (esu) and 10−28 (esu) under ns laser excitation respectively. Showing large third-order optical nonlinearity in CH3NH3PbBr3 thin films, suggesting their potential for photonics applications.

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