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FUNDAMENTAL PROPERTIES OF HYBRID PEROVSKITE MATERIALS FOR RENEWABLE ENERGY APPLICATIONS

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Lead-free organic-inorganic tin halide perovskites were prepared and investigated by a rapid screening technique utilizing a modified scanning electrochemical microscope (SECM). We studied liquid junction photoelectrochemical (PEC) cells based on p-type methylammonium tin halide (MASnI3-xBrx) perovskites employing the benzoquinone (BQ) redox couple, BQ/BQ•−, in dichloromethane (CH2Cl2). We found that the optimized Sn-based mixed halide perovskite, MASnI0.5Br2.5, exhibits enhanced performance and stability in liquid-junction PEC cells, with a power conversion efficiency of 1.51% (an increase of 20.8%) and a photovoltaic lifetime of 175 min (an increase of 75.0%), in comparison to MASnI3 perovskites.

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