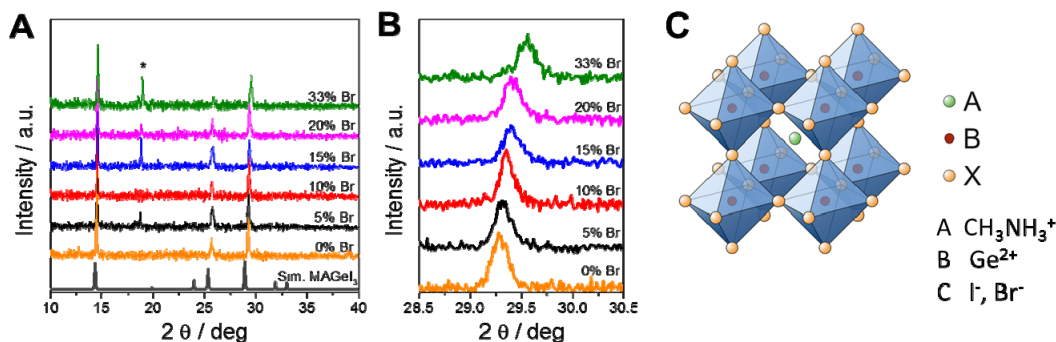


Preparation of methylammonium germanium iodide perovskites and their applications in solar cells

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Lead halide perovskites (APbX_3 , $\text{A} = \text{Cs, Rb, methylammonium, formamidinium}$, $\text{X} =$ halogenide) are drawing strong attention since several years due to excellent photovoltaic properties. However, because of toxicity issues of lead perovskites, which there is now growing endeavor to study lead-free perovskite materials. In this contribution we focus on the preparation of methylammonium germanium iodide perovskites. Due to the instability of the Ge^{2+} state towards oxidation, the preparation and stabilisation of AGeX_3 perovskite is challenging. In this contribution, we introduce bromide ions into a methylammonium germanium iodide perovskite, and show that this leads to a significant improvement of the solar cell performance along with a slight enhancement of the stability of the germanium perovskite. By substituting 10% of the iodine with bromide, power conversion efficiencies up to 0.57% were obtained in $\text{MAGeI}_{2.7}\text{Br}_{0.3}$ based solar cells. [1]



[1] I. Kopacic, B. Friesenbichler, S. F. Hoefler, B. Kunert, H. Plank, T. Rath, G. Trimmel *ACS Appl. Energy Mater.* **2018**, 1, 343–347.