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Ink-jet perovskite films for photocatalytic CO2 reduction and H2O decomposition

Perovskite materials are one of the most promising photocatalysts for generating clean, energetic vectors and solar fuels. One of the main barriers to its massive production is the high cost and complicated deposition techniques. As an alternative, this work sought solutions to manufacture large-area printed films with high-throughput rates and minimal waste by ink-jet printing. This technology promoted the formation of crystalline and porous films with heterogeneous morphology, which absorb UV and Visible light. Two sets of perovskites were explored based on oxides: ABO3 (A=Na, Li, K, B=Na, Nb) and halides: KMgI3, which were evaluated as photocatalysts in the H2O and CO2 reduction to produce energetic vectors and solar fuels, respectively. The energy conversion efficiency was calculated to verify the efficiency of the studied systems, reaching values up to 7%. Furthermore, the stability and reuse of the perovskite ink-jet films were demonstrated after consecutive cycles of photocatalytic evaluation.

Keywords

Perovskites, Ink-jet printing, CO2 reduction, H2O splitting, Photocatalysis, Solar fuels.

Reference

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Author approval

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