Photocatalytic Reduction of CO_2-to-C_1 by Dual Photoelectrode Reactor

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Abstract

Global warming has been proved to be caused by the excessive emissions of CO_2 from the usage of fossil fuels. Therefore, promoting carbon mitigation strategies and energy transition are of increasing importance. Reduction of CO_2 to C_1 fuels by solar energy like artificial photosynthesis is thus environmentally attractive and close the carbon cycle. There are still major challenges such as low conversion efficiency and high recombination of electron-holes during photocatalytic reduction of CO_2. We have developed novel perovskite quantum dots (PQDs) encapsulated within metal organic frameworks (MOFs) (PQD@MOF) composite for dual photoelectrodes to proceed the high-efficiency photocatalytic reduction of CO_2. By the PQD@MOF under visible-light irradiation, about 500 μmol C_1/mgCat/h were obtained. It is apparent that the novel PQD@MOF photocatalysts are chemically feasible for solar-driven CO_2 reduction to C_1 fuels.

Keywords: *photocatalytic reduction of CO_2, perovskite, metal organic frameworks, reactor design*

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