2D transition metal carbide for catalysis

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Transition-metal carbide (TMC), owing to its electronic conductivity, chemical stability and physical properties, has aroused widespread interests in catalysis. Here, we have systematically studied the photocatalytic hydrogen (H_2) evolution of metallic cobalt carbide (Co_2C) by a combination of theoretical and experimental investigations. In term of intrinsic proton reduction property of Co_2C (020) facet and facile interfacial electron transfer, the assembled architecture of QDs/Co_2C can give an rate of ~18000 μmol g^{-1} h^{-1} (λ = 450 nm) using TMC as cocatalysts and an apparent quantum yield of ~2.7% of photocatalytic H_2 evolution, a ~10-fold enhancement compared with bare QDs under identical conditions. Our results indicate that Co_2C with suitable morphology and facet exposure can work as a cocatalyst to achieve photocatalytic H_2 evolution.

References

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Figures

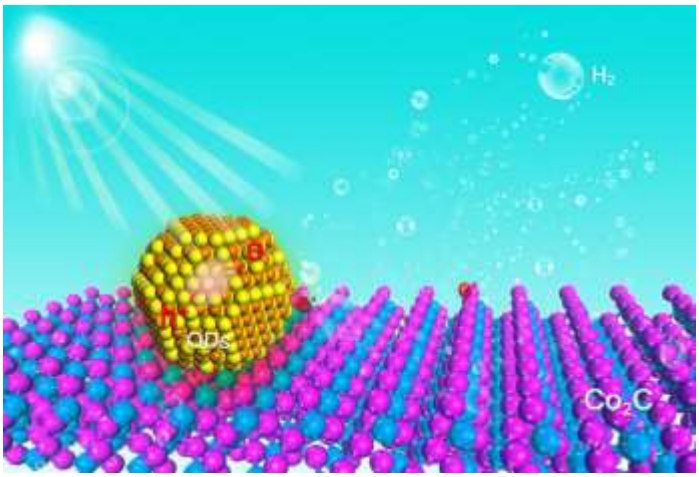

Figure 1: The application of ultrathin Co_2C nanosheets in photocatalytic hydrogen evolution.