Photoelectrochemical productions of formic acid and methanol from carbon dioxide on metal decorated CuO/Cu_2O layered thin film under visible light irradiation

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As a cathode material for fuel generation from CO_2 reduction in photoelectrochemical system, layered CuO/Cu_2O film was developed and its surface was decorated with transition metals (e.g. Au, Cd, Cu, Pb, and Sn). Deposition of the transition metals, especially Pb, effectively enhanced CO_2 conversion performance to fuels. However, fast performance degradation was observed in this system, resulted from reduction of CuO to Cu_2O/Cu during the reaction.