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Atomic-scale studies on the dissociation of CO2 over single Sn atoms dispersed on Au(111)

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We utilize scanning tunneling microscopy (STM) to probe the nanoscale architecture of catalytic systems consisting of tin (Sn) deposited on inert gold substrates. Upon CO2 exposure, CO2 is captured and dissociated in places where there are two or more adjacent single Sn atoms. This results in O-terminated Sn formations that are observed to move around the gold surface. Notably, our results suggest that the activation of CO2 by single Sn atom catalysts need not take place in harsh environments. The feasibility of catalytic function at low temperatures will have an enormous impact on developing industrial methods of CO2 capture and utilization, ultimately leading to a significant reduction of greenhouse gases in the atmosphere.

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