

CO₂-induced Reversible Structure Transition between Sierpiński Triangles and Chains on Au(111)

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Reversible transformations between periodic and ordered yet aperiodic structures are of fundamental importance and have not been achieved. In this work, we investigated the CO₂-induced reversible structure transition between Sierpiński triangles and chains on Au(111) by low-temperature scanning tunneling microscopy. The metal-organic Sierpiński triangles were constructed by 4,4''-dicyano-1,1':3',1''-terphenyl molecules and Fe atoms. The adsorbed CO₂ molecules induced the structure transition by transforming the stable 3-fold coordination Fe(C3PC)₃ motif to the less stable Fe(C3PC)₄ motif. STs were recovered after annealing the sample at 350K. The mechanism of transition process was interpreted with density functional theory calculations.