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Catalytic Methanol Oxidation over Copper: Observation of Reaction-induced Nanoscale Restructuring by Means of in situ Time-Resolved X-Ray Absorption Spectroscopy

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Abstract

The catalytically active copper phase for the partial methanol oxidation is studied by means of time-resolved extended X-ray absorption fine structure (EXAFS) spectroscopy combined with the detection of the catalytical turnover. It is found that the active copper is a strained nanocrystalline form of the metal. The metal is no longer made up from large crystallites and contains a defect structure in which oxygen is already intercalated.