

In situ FTIR studies for photocatalytic reduction of CO₂ by TiO₂ nanotubes

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Abstract

A better understanding of CO₂ adsorption on the one-dimensional TiO₂ nanotube (TiNT) is of great importance for improving its photocatalytic reduction ability. In this work, adsorption and photocatalytic reduction of CO₂ on the TiNT was studied by *in situ* FTIR. The IR absorbance features at 1303 and 1393 cm⁻¹ are associated with carbonate species, e.g., bidentate carbonate on the TiNT. Complete desorption of CO₂ from the TiNTs may occur at T>418 K. The *in situ* FTIR studies indicate bidentate carbonate and carboxylate species on the TiNTs, which may conduct the surface reactions enhanced by UV/Vis light to yield of low carbon fuels or chemicals.

Keywords: *In situ* FTIR, photocatalytic reduction of CO₂, TiO₂ nanotubes