

# *In situ* FTIR studies for photocatalytic reduction of CO<sub>2</sub> by TiO<sub>2</sub> nanotubes

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## **Abstract**

A better understanding of CO<sub>2</sub> adsorption on the one-dimensional TiO<sub>2</sub> nanotube (TiNT) is of great importance for improving its photocatalytic reduction ability. In this work, adsorption and photocatalytic reduction of CO<sub>2</sub> on the TiNT was studied by *in situ* FTIR. The IR absorbance features at 1303 and 1393 cm<sup>-1</sup> are associated with carbonate species, e.g., bidentate carbonate on the TiNT. Complete desorption of CO<sub>2</sub> 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 CO<sub>2</sub>, TiO<sub>2</sub> nanotubes