Novel Nanocomposite Materials for Efficient Photocatalytic Reduction of CO$_2$ to Fuels

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We aim to develop novel nanocomposite materials to convert CO$_2$ and H$_2$O to fuels (e.g., CO and CH$_4$) under UV-visible illumination

- Cu, Ag, or Ce modified TiO$_2$ nanoparticles as the photocatalysts
- Ordered mesoporous SBA-15 as the catalyst support
- In-situ DRIFTS analyses to understand the reaction mechanism

In situ DRIFT spectra of $^{13}$CO$_2$ interaction on the surface of Cu(I)/TiO$_2$-x

Rate of CO$_2$ reduction to CO and CH$_4$ using Ce-TiO$_2$/SBA15 catalyst under UV-vis illumination