**Fabrication of TiO2 Photocatalyst with Increased Photogenerated Charge Separation for Visible Light Driven CO2 Conversion**

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Abstract: Significant efforts have been devoted to develop efficient visible-light-driven photocatalysts for the conversion of CO2 to chemical fuels. The photocatalytic efficiency for this transformation largely depends on CO2 adsorption and diffusion. However, the CO2 adsorption on the surface of photocatalysts is generally low due to their low specific surface area and the lack of matched pores. Here we report a well-defined porous polymer-TiO2 composite structure with relatively high surface area i.e., 159.6 m2 g−1. This composite shows high photocatalytic performance especially for CH3OH production, i.e., 29.31 μmol g−1 h−1, under mild reaction conditions without the use of sacrificial reagents or precious metal co-catalysts. The so prepared nanocatalyst has been characterized using XRD, SEM, TEM, BET, The enhanced CO2 reactivity can be ascribed to their improved CO2 adsorption and diffusion, visible-light absorption, and photo-generated charge separation efficiency. This strategy provides new insights of fabrication of mesoporous photocatalysts for solar-to-fuel conversion.

**References:**

1. Leung DYC, Caramanna G, Maroto-Valer MM. An overview of current status of carbon dioxide capture and storage technologies. Renewable and Sustainable Energy Reviews. 2014;39:426-443
2. Peters M, Mueller T, Leitner W. CO2: From waste to value. Chemical Engineer. 2009;(813): 46-47
3. Liu, G.; Hoivik, N.; Wang, K.; Jakobsen, H. Engineering TiO2 nanomaterials for CO2 conversion/solar fuels. *Sol. Energy Mater. Sol. Cells* **2012**, *105*, 53–68.
4. Neaţu, Ş.; Maciá-Agulló, J.A.; Garcia, H. Solar light photocatalytic CO2 reduction: General considerations and selected bench-mark photocatalysts. *Int. J. Mol. Sci.* **2014**, *15*, 5246–5262.