

Greenhouse gases mitigation by photocatalysis

Hossam A. El Nazer, Yasser Mahmoud, Ahmed Elnazer, ElZahraa El-Gohary
National Research Centre
Egypt

Abstract

Climate change is one of the most important issues facing the world. One of the pillars of combating this phenomenon is the mitigation of greenhouse gases emissions. Environmental fixation of CO₂ through the reaction with aromatic epoxides to produce the corresponding cyclic carbonates under atmospheric pressure and ambient temperature, and photocatalytic oxidation of carbon monoxide (CO) and (NO_x) gases have been investigated under optimized conditions. The present investigation has also focused on preparation of photocatalysts that are possessing two desirable properties: large surface area and high crystallinity. The former property should increase the number of surface-adsorbed substrate(s) to enhance the capture of photogenerated electrons (e⁻) and positive holes (h⁺), and the latter, i.e., less defects acting as the recombination center, should suppress mutual e⁻-h⁺ recombination.

Keywords: Photocatalyst, NO_x degradation, CO₂ fixation, Photo-oxidation of CO, TiO₂, MWCNT.