

Photocatalytic decomposition of formic acid on Pt/TiO₂

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Photocatalysis is an effective method of oxidizing or decomposing organic contaminants present in low concentrations in the air at room temperature. The rate of photocatalytic decomposition (PCD) of formic acid on 0.2% Pt/TiO₂ was studied using transient isothermal reaction and temperature programmed desorption. Formic acid is of interest because it is an intermediate oxidation product of many organics. Transient photocatalytic decomposition shows that water co-adsorbed with formic acid does not significantly affect the rate of decomposition. Water that is weakly adsorbed, however, significantly increases the rate. Only hydrogen was formed and any other product such as oxygen or carbon dioxide was not produce when water was injected in the reactor in the dark after PCD of formic acid. It is inferred that the role of weakly adsorbed water is to replenish the vacant lattice oxygen of TiO₂ surface which are the main reason for the rate decrease.