Adsorption and photocatalytic characteristics for degradation of Persistent Organic Pollutants on Carbon-coated TiO_2

의민주, 문 희[1,*], 김태원[1], 심왕근[1]
전남대학교 응용화학공학부; [1]전남대학교
(hmoon@chonnam.ac.kr*)

Carbon-coasted TiO_2 samples were prepared from the mixture of poly (vinyl alcohol) and commercial TiO_2 (P-25) with different mass ratios at a heating temperatures of 500-900℃for 1h in high purity Argon gas flow. The samples were characterized by XRD, SEM, TEM, TGI and BET analysis. Adsorption properties and photocatalytic activities of commercial and carbon-coated TiO_2 catalysts were compared for the oxidation of methylene blue (MB). The photocatalytic degradation of MB in a batch photocatalytic reactor, using a UV lamp as a light source and TiO_2 as a photocatalyst, was investigated. The effects of various parameters such as the initial MB concentration, and the initial pH on the MB degradation rate of TiO_2 photocatalysis were examined. In the presence of both UV light illumination and TiO_2 catalyst, MB was more effectively degraded than with either UV or TiO_2 alone. The reaction rate was found to obey pseudo first-order kinetics represented by the Langmuir-Hinshelwood model. It was also observed that carbon-coated samples gave faster kinetics for the oxidation of organic molecules.