PHOTOINDUCED REDUCTION OF WO_3 ON TiO_2 AND ITS ROLE ON PHOTOCHEMICAL SYNTHESIS OF NH_3

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Reduction of yellow WO_3 adsorbed on rutile TiO_2 takes place upon irradiation with a 125 W Hg-are lamp in aqueous suspension. The resultant blue form of tungsten oxide has been identified from X-ray powder diffraction data to be $WO_{2.90}$. On account of the reported photochemical activity of reduced tungsten oxides for N_2 reduction, a detailed investigation was carried out on the photocatalytic activity of the composite catalyst TiO_2/WO_3. It was found that the optimum catalytic activity was observed for a dopant level of 15% WO_3 on TiO_2 (w/w) at a pH of 6. Conditions in the preparation of the catalyst also affect the yield of NH_3 obtained. Thus an optimum heating time of 2h at 250°C was found to give the highest NH_3 yields. These observed effects suggest that the photoinduced electron injection from the TiO_2 to WO_3 depends on the particle size of the agglomerates formed for effective reduction of W(vi) to lower valence states.