Carbon and Nitrogen/Carbon Modified Titania for Visible Light Photocatalysis

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Modification of *only UV active* but already commercially utilized titania photocatalysts for also *visible light response* is a central topic of semiconductor photocatalysis. Presently the most promising approach is the doping or modification by main group elements like carbon and nitrogen. Many proposals on the nature of the species responsible for visible light activity have been made. They range from interstitial carbon or nitrogen atoms to lattice defects generated during the preparation process, which usually consists of calcining titania in the presence of corresponding precursor compounds. Some of the suggestions were also supported by theoretical calculations.

In this contribution we shall summarize our recent findings on the chemical nature of commercially available carbon-modified titania and on the detailed modification mechanism of a N,C-modified photocatalyst prepared from titania and urea [1,2]. Surprisingly, in the latter case titania acts as thermal catalyst for the conversion of urea into an organic polymer, prepared the first time already by J. von Liebig [3].

The electronic structure of N,C-TiO_2 is experimentally addressed by wavelength dependent measurements of quasi-Fermi potential and complete photooxidation of formic acid.

References

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[3] J. von Liebig, Pharm. Zentralblatt 5(1834)671.