

Interaction between cosmetic metal oxides and acidic pollutants

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The transition metal oxide powders such as ZnO and TiO₂ which have been widely used as cosmetic materials, were prepared. Also a new preparation method of uniform Ti-doped α -Fe₂O₃ films was developed in order to get accurate informations on the excited states upon photoirradiation. Their surface and crystalline states were examined by X-ray diffraction, X-ray photoelectron spectroscopy, UV spectroscopy, electrical conductivity measurement, and Ar or N₂ adsorption at 77K. The adsorption of NO on ZnO and TiO₂ was measured at 303K and the effect of photoirradiation on the NO adsorption was examined by a volumetric method and in situ FT-IR spectroscopy. The photoirradiation gave rise to a marked chemisorption, which produced new IR bands due to the oxidized species of NO adsorped. A perfect deactivation of the surface of ZnO and TiO₂ should be preferable to avoid the formation of acidic species of atmospheric pollutants of NO under the photoirradiation condition. The doping of Ti in α -Fe₂O₃ changed the UV absorption according to the valence controll was clearly shown.