

Effect of a long-term exposure of anatase TiO₂ powder doped with surface-located Sb³⁺ ions to UV radiation on its photocatalytic activity

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Routine X-Ray Diffraction (XRD) measurements were performed on a powder sample ARL X'TRA Thermo Scientific diffractometer using Cu K_{α} radiation (wavelength $\lambda = 1.5418 \text{ \AA}$). All studied catalysts were found to be anatase type (space group $I4_1/amd$) single-phase polycrystalline materials. An XRD pattern of the hydrogen-annealed pristine sample 0.6 at% Sb is shown in Figure S1. Its specific surface area S_{BET} determined by the BET method was found to be nearly $56 \text{ m}^2\text{g}^{-1}$ and virtually not affected by the exposure to UV-radiation. During exposure, the thin walled glass test tube, containing *ca* 750 mg of pristine hydrogen- annealed 0.6 Sb at% / TiO₂ along with 5 ml of deionized water, was tightly closed with a stopper and set up at a distance of 30 mm underneath the Wood's lamp bulb, parallel to its axis. The water layer thickness over the studied powder was of 3-4 mm. The contents of the test tube were regularly stirred up. ¹²¹Sb Mössbauer spectra were recorded on a MS-1104 spectrometer and analyzed by a least-square fitting program. To perform ¹²¹Sb Mössbauer measurements a Ca^{121m}SnO₃ source ($E_{\gamma} = 37.15 \text{ keV}$), producing in a thin NaI(Tl) scintillator the 8.5 keV escape peak was used. During the measurements both the Ca^{121m}SnO₃ source and studied powder sample (absorber) were introduced into the hole of a copper bar immersed in a Dewar flask filled with liquid nitrogen. Under these conditions, the temperature of both the source and absorber was close to 100 K.

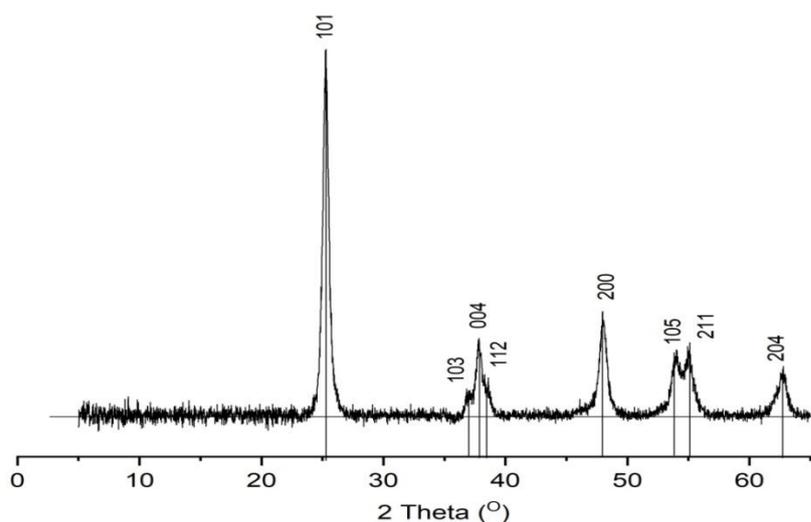


Figure S1 XRD pattern of hydrogen-annealed 0.6 at% Sb/anatase TiO₂.