Electronic supplementary materials *Mendeleev Commun*., 2023, **33**, 864–865

Application of the ^{121}Sb Mössbauer spectroscopy to characterizing titania-based photocatalysts modified by lone pair cations

Mikhail V. Korolenko, Pavel B. Fabritchnyi and Mikhail I. Afanasov

Routine X-Ray Diffraction measurements were performed on a powder sample ARL X'TRA Thermo Scientific diffractometer using Cu K_α radiation (wavelength λ = 1.5418 Å). All studied catalysts were found to be anatase type (space group $I4_1/amd$) single-phase polycrystalline materials. As an example, Figure S1 shows the X-ray diffraction pattern of catalyst (2 at % $Sb^{III}\downarrow/\alpha$-$TiO_2$). Their specific surface area S_{BET} determined by the BET method was found to be 56–58 $m^2\,g^{-1}$ and virtually not affected by the presence of the dopant used.

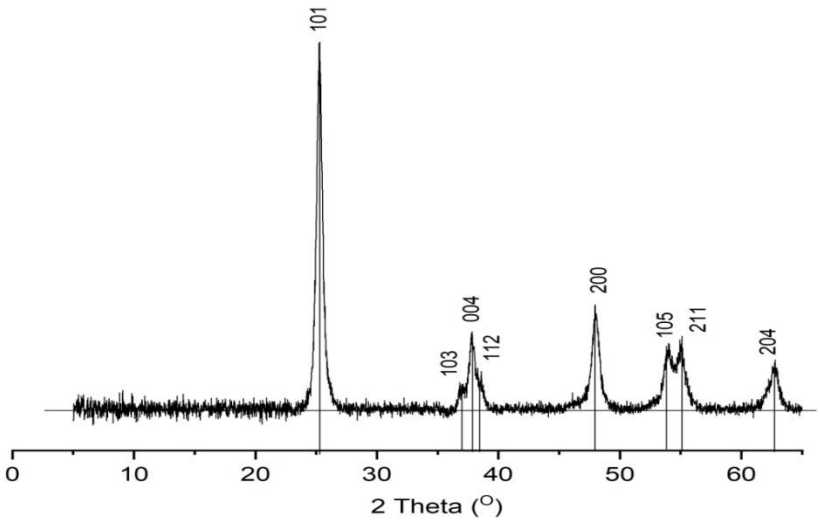

Figure S1. XRD pattern of catalyst 2 at % $Sb^{III}\downarrow/\alpha$-$TiO_2$

^{121}Sb Mössbauer spectra were recorded on a MS-1104 spectrometer and analyzed by a least-square fitting program. To perform^{121}Sb Mössbauer spectroscopic measurements the 8.5 keV escape peak, produced by Mössbauer gamma rays (E_γ = 37.15 keV) in a thin NaI(Tl) scintillator, was used. During the measurements both $Ca^{121}SnO_3$ 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 absorber was close to 100 K and thus allowed us to consider the spectral contributions of the eventually present chemically different species of antimony as an acceptable estimate of their abundances.