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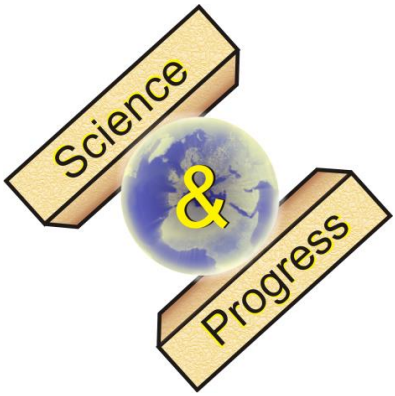

International Student Conference in Saint-Petersburg State University (Saint-Petersburg, Peterhof)

November 10-12, 2020

IR spectroscopic study of photostimulated CO desorption on the TiO_2 surface

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In situ IR spectroscopy is a very suitable method for studying non-stationary processes, including photoprocesses on the surface of photoactive materials [1, 2]. In our work, this technique was applied to examine the process of desorption of carbon monoxide molecules adsorbed on the titanium dioxide surface upon UV irradiation. The obtained data are very important for understanding the mechanisms of such surface processes involving photogenerated carriers as photosorption-photodesorption, photostimulated hydrophilicity, and photoreactions.

The home-made transmission-mode IR cell with dual-beam configuration was used for *in situ* experiments (Fig. 1a). The configuration and operation of the device are presented. The obtained spectroscopic data on photoactivated desorption of carbon monoxide at ambient temperature from the dehydrated TiO_2 surface are presented and analyzed. Fig. 1b shows the kinetics of the intensity changes for the adsorbed CO band during "on-off" experiments with UV irradiation of different light densities. In conclusion, two plausible mechanisms of observed phenomenon are discussed.

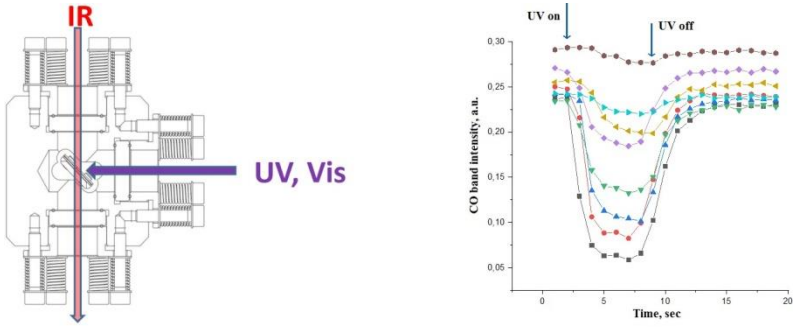

Fig. 1. (a) The horizontal cross section of bottom part of IR cell. (b) Changes of the band intensity of CO adsorbed on TiO_2 surface during photoexperiments.

References

1. K.M. Bulanin, D.W. Bahnemann, A.V. Rudakova // Rev. Sci. Instrum., 90, ID 105113, 8 p. (2019).
2. P. Pichat // Catal. Today, v. 224, p. 252-253 (2014).