

**Title:** Study of gas molecule – surface interaction  
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**Abstract:** In this work, we examined the suitability of rhodium deposited on a plasma sprayed substrate of titanium dioxide for catalysis reactions. With X-ray photoelectron spectroscopy method, the thermal stability of TiO<sub>2</sub> prepared with plasma spray technology on aluminum plate was tested at first. Then, rhodium was evaporated on substrate and thermal stability of the whole system Rh/TiO<sub>2</sub> was determined. Further methods of thermal desorption spectroscopy and molecular beam were used to study adsorption and desorption of CO and reaction of CO with oxygen. It was verified that the system Rh/TiO<sub>2</sub> ceases to adsorb CO after heating above 620 K, also the CO reaction with oxygen exhibits considerably lower intensity after heating above 620 K. After calibrating on rhodium plate, it was determined that the intensity of CO<sub>2</sub> creation on Rh/TiO<sub>2</sub> is four times lower than intensity on the rhodium plate. Unprompted adsorption and desorption passivation of the system, however, seems to be the most significant problem. Therefore, the system was assessed as unsuitable for further research.

**Keywords:** Rh, TiO<sub>2</sub>, CO adsorption and desorption, X-ray photoelectron spectroscopy, thermal desorption spectroscopy.