On reaction rate constants IO+NO, IO+CO

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A method, allowing to define, whether an investigated chemical reaction in a gas phase or on a surface of a reactor for those cases when dependence of the reaction rate on concentration of reagents for heterogeneous and for homogeneous reaction are identical, has been suggested. The method has been used for investigation of reactions of IO with nitric oxide and carbon monoxide. Experiments have been run in the flow reactor with using a method of resonance fluorescence to record atoms of iodine. It has been proved that the reaction of radical IO with nitric oxide proceeds in the gas phase, whereas the reaction of radical IO with carbon monoxide proceeds on the surface of the reactor. It has been obtained that reaction rate constant of IO with nitrogen monoxide in the temperature range 298-353 K is

$k_{NO}(T)=(1{,}01\pm0{,}2)\cdot10^{-11}\cdot\exp((210\pm80)/T)$ cm3*molecule*s-1

and the same for reaction of IO with carbon monoxide is

$k_{CO}(T)=(1{,}14\pm0{,}64)\cdot10^{-14}\cdot\exp((612\pm41)/T)$ cm3*molecule*s-1.