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PHOTOCATALYTIC DESTRUCTION OF NO2 AND HONO IN THE GAS PHASE USING TITANIUM DIOXIDE COATINGS

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Titanium dioxide (TiO2) is an attractive material for numerous technological applications such as photocatalytical applications. A particular interest arises from the possibility of obtaining TiO2 coatings that, being activated by sun light, are able to destroy the air pollutants which deposit on them. Thus, TiO2 can in some conditions have the ability to allow the environmental purification of air by the decomposition and removal of harmful substances, such as volatile organic compounds (VOC), NOx, SO2, O3 and particulate matter, etc. These abilities of TiO2 can potentially lead to the development of a new class of building materials having self-cleaning and depollution properties. A new experimental set-up for determining the removal of nitrogen dioxide (NO2) and nitrous acid (HONO) was developed. High purity standard atmospheres containing NO2 and/or HONO were generated. The pollutants were exposed to TiO2 coatings in absence and in presence of simulated tropospheric sunlight. The photocatalytic activity was monitored by means of diffusion techniques (denuder and passive systems). After the collection of NO2 and HONO the denuders and the passive samplers were extracted and analysed by ion chromatography. In the present study we report on the kinetics and mechanisms of the heterogeneous reaction, on the photocatalytic reactivity of TiO2 and the reaction efficiency.