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Adsorption and reactivity of O and N atoms on oxide surfaces under plasma exposure D. MARINOV, O. GUAITELLA, A. ROUSSEAU, LPP, Ecole Polytechnique, UPMC, Universite Paris Sud — Interaction of nitrogen and oxygen atoms with oxide surfaces (SiO2, pyrex, TiO2) was studied. Stable N (O) were grafted to the surface by a low pressure ($\sim$1 mbar) rf discharge in N_2 (O_2) and then characterized by a number of techniques. Conversion and production of new molecules (such as NO, NO_2) on the surface catalyzed by O_{ads} and N_{ads} was investigated using in-situ laser absorption measurements. Reactivity of adsorbed atoms under plasma exposure was studied with isotopic substitution technique. Typically, the pretreated surface containing $^{14}N_{ads}$ (or $^{16}O_{ads}$) was exposed to a pulsed discharge in isotopic gas $^{30}N_2$ (or $^{36}O_2$) and production of $^{14}N^{15}N$ (or $^{16}O^{18}O$) on the surface was monitored using a quadrupole mass spectrometer. This allowed absolute measurements of the density of adsorbed species and assessment of the role of chemisorbed atoms as active sites for surface recombination. Kinetics of adsorption and desorption processes was studied by varying the duration of plasma exposure. It was found that under direct plasma exposure not only adsorbed atoms but also atoms of the material participate in surface reactions. Oxygen atoms composing the outmost layer of silica-like surfaces are continuously exchanged with the gas phase O and N atoms produced in the discharge.

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