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Surface Reactions Involving Gas-Phase Atoms

Jihwa Lee

Department of Chemical Technology,
College of Engineering, Seoul National Univ.,
Seoul 151-742, Korea

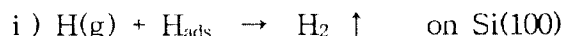
Bimolecular surface reactions usually occur between two adsorbed species, in which encounters are made possible by surface diffusion of reacting species:



Most surface-catalyzed reactions belong to this class(Langmuir-Hinshelwood reaction),and hence it has been extensively studied so far. In another type of reaction called Eley-riideal reaction,molecules impinging on the surface from the gas-phase directly react with adsorbed species before they become fully accomodated to the surface temperature,i.e.



If molecule B(g) is an energetic species like an atom or a radical,the reaction (2) may not have any energy barrier to have a high reaction probability. Such a reaction is inherently nonthermal in nature,and its dynamics would be distictively different from that of LH reaction. Here I will present three examples of surface reaction which involves H or O atoms. Specifically they are



where O^* is an hot oxygen atom produced by Photo-dissociation of adsorbed N_2O .

Implication of ER reaction for the deposition of thin films by Chemical Vapor Deposition(CVD), Plasma Enhanced CVD, and Photo CVD will also be addressed.