

Abstract Submitted
for the DAMOP06 Meeting of
The American Physical Society

Sorting Category: 3.6 (T)

Neutralization of H- at Nanostructured Surfaces¹

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The charge transfer rates and the neutralization probabilities for hydrogen anions colliding with nanostructured (vicinal) surfaces are obtained by direct numerical integration of the time-dependent Schroedinger equation for the motion of the active electron in the field of the projectile-surface compound. The electronic structure of the surface is calculated from a Thomas-Fermi - von Weizsaecker statistical model with local density approximation for the exchange-correlation energy. In fixed-ion approximation, the decay rate of the electronic state of the anion in front of the surface is obtained by projecting the density of states of the collision system onto the unperturbed projectile level. The ion neutralization probability is calculated from this static width within a rate equation approach for a set of broken-straight-line collision trajectories for kinetic energies of 1 keV. The dependence of decay rates and neutralization probabilities on the surface morphology and the scattering trajectories, and a comparison of our numerical results with the experiments will be discussed.

¹Supported by NSF and DoE.

Prefer Oral Session
 Prefer Poster Session

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Date submitted: 31 Jan 2006

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