Charge Transfer Processes between H/D and Small Molecu-
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37830, USA — Charge transfer on molecule proceeds through dynamically coupled 
electronic, vibrational, and rotational degrees of freedom. The inelastic vibrational 
processes, which go along with the reaction, can be experimentally investigated by 
using H/D systems, which do not allow multi-electron capture. Using the upgraded 
ion-atom merged-beams apparatus at Oak Ridge National Laboratory, absolute di-
rect charge transfer cross sections for H~2^+, D~2^+, CO^+, O_2^+, and H_3^+ are measured from 
keV/u collision energies where the collision is considered “ro-vibrationally frozen” 
to few eV/u energies where collision times are long enough to sample vibrational 
modes. The measurements presented here benchmark high energy theory and vi-

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