

AU Rosen, S, Derkatch, A, Semaniak, J, Neau, A, Al-Khalili, A, Le Padellec, A, Vikor, L, Thomas, R, Danared, H, af Ugglas, M, Larsson, M

TI Recombination of simple molecular ions studied in storage ring: dissociative recombination of H₂O⁺

SO FARADAY DISCUSSIONS

LA English

DT Article

ID ABSOLUTE CROSS-SECTIONS; DIELECTRONIC-RECOMBINATION; BRANCHING FRACTIONS; POLYATOMIC IONS; EXCITATION; ELECTRONS; CHEMISTRY; PRODUCTS; OXYGEN; STATES

AB Dissociative recombination of vibrationally relaxed H₂O⁺ ions with electrons has been studied in the heavy-ion storage ring CRYRING. Absolute cross-sections have been measured for collision energies between 0 eV and 30 eV. The energy dependence of the cross-section below 0.1 eV is found to be much steeper than the E⁻¹ behaviour associated with the dominance of the direct recombination mechanism. Resonant structures found at 4 eV and 11 eV have been attributed to the electron capture to Rydberg states converging to electronically excited ionic states. Complete branching fractions for all dissociation channels have been measured at a collision energy of 0 eV. The dissociation process is dominated by three-body H + H + O breakup that occurs with a branching ratio of 0.71.

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