AU Semaniak, J, Larson, A, Le Padellec, A, Stromholm, C, Larsson, M, Rosen, S, Peverall, R, Danared, H, Djuric, N, Dunn, GH, Datz, S
TI Dissociative recombination and excitation of CH5+: Absolute cross sections and branching fractions
SO ASTROPHYSICAL JOURNAL
LA English
DT Article
DE ISM, clouds; ISM, molecules; methods, laboratory; molecular processes
ID HIGH-RESOLUTION MEASUREMENT; POLYATOMIC IONS; DIELECTRONIC RECOMBINATION; IONOSPHERE; ELECTRONS; MOLECULES; PRODUCTS; H-3(+); H-3+; BEAM
AB The heavy-ion storage ring CRYRING was used to measure the absolute dissociative recombination and dissociative excitation cross sections for collision energies below 50 eV. Deduced thermal rates coefficients are consistent with previous beams data but are lower by a factor of 3 than the rates measured by means of the flowing afterglow Langmuir probe technique. A resonant structure in dissociative recombination cross section was found at 9 eV. We have determined the branching fractions in DR of CH5+ below 0.2 eV. The branching is dominated by three-body CH3 + H + H and CH2 + H-2 + H dissociation channels, which occur with branching ratios of approximate to 0.7 and approximate to 0.2, respectively; thus methane is a minor species among dissociation products. Both the measured absolute cross sections and branching in dissociative recombination of CH5+ can have important implications for the models of dense interstellar clouds and abundance of CH2, CH3 and CH4 in these media.
C1 Royal Inst Technol, Dept Phys 1, S-10044 Stockholm, Sweden. Univ Stockholm, Dept Phys, S-11385 Stockholm, Sweden. FOM, Inst Atom & Mol Phys, NL-1098 SJ Amsterdam, Netherlands. Stockholm Univ, Manne Siegbahn Lab, S-10405 Stockholm, Sweden. Univ Colorado, JILA, Boulder, CO 80309 USA. Oak Ridge Natl Lab, Div Phys, Oak Ridge, TN 37831 USA.
RP Semaniak, J, Royal Inst Technol, Dept Phys 1, S-10044 Stockholm, Sweden.
NR 45
TC 34
PU UNIV CHICAGO PRESS
PI CHICAGO
PA 5801 S ELLIS AVENUE, CHICAGO, IL 60637 USA
SN 0004-637X
J9 ASTROPHYS J
JI Astrophys. J.
PD MAY 10
PY 1998
VL 498
IS 2
PN Part 1
BP 886
EP 895
PG 10
SC Astronomy & Astrophysics
GA ZN664
UT ISI:000073669300034