

# DISSOCIATIVE RECOMBINATION AND EXCITATION OF $\text{CH}_5^+$ : ABSOLUTE CROSS SECTIONS AND BRANCHING FRACTIONS<sup>1</sup>

*J. Semaniak,<sup>2</sup> Å. Larson,<sup>2</sup> A. Le Padellec,<sup>2</sup> C. Strömholm,<sup>2</sup> M. Larsson,<sup>3</sup> S. Rosén,<sup>3</sup>  
R. Peverall,<sup>4</sup> H. Danared,<sup>5</sup> N. Djuric,<sup>6</sup> G. H. Dunn,<sup>6</sup> and S. Datz*

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 three 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  $\text{CH}_5^+$  below 0.2 eV. The branching is dominated by three-body  $\text{CH}_3 + \text{H} + \text{H}$  and  $\text{CH}_2 + \text{H}_2 + \text{H}$  dissociative channels, which occur with branching ratios of  $\approx 0.7$  and  $\approx 0.2$ , respectively; thus methane is a minor species among dissociation products. Both the measured absolute cross sections and branching in dissociative recombination of  $\text{CH}_5^+$  can have important implications for the models of dense interstellar clouds and abundance of  $\text{CH}_2$ ,  $\text{CH}_3$ , and  $\text{CH}_4$  in these media.

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  2. Royal Institute of Technology, Stockholm, Sweden.
  3. Stockholm University, Stockholm, Sweden.
  4. FOM Institute for Atomic and Molecular Physics, Amsterdam, The Netherlands.
  5. Manne Siegbahn Laboratory at Stockholm University, Sweden.
  6. JILA, University of Colorado, Boulder, CO.