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Dissociative recombination of $CH_2NH_2^+$ and $NH_2CH_2O^+$ ions[1] VIATCHESLAV KOKOOULINE, CHI HONG YUEN, University of Central Florida, IOAN SCHNEIDER, Université du Havre, Normandie Université, Le Havre, France, CECILIA CECCARELLI, Institut de Planétologie et d'Astrophysique, Grenoble, France, NADIA BALUCANI, Università di Perugia, Perugia, Italy, MEHDI AYOUZ, CentraleSupeléc, Université Paris-Saclay, Gif-sur-Yvette, France — Cross sections for dissociation recombination (DR) and vibrational excitation of the $CH_2NH_2^+$ and $NH_2CH_2O^+$ ions in collisions with electrons are determined theoretically using an approach that combines the normal modes approximation for the vibrational states of the target ion with use of the UK R-matrix code to evaluate electronion scattering matrices. The corresponding thermally averaged rate coefficients are computed and fitted to analytical formulas. The obtained DR rate value for $CH_2NH_2^+$ is significantly smaller than the values recently employed in the photochemical models of the upper atmosphere of Titan, which has an important impact on the models that aim to reproduce the Titan ammonia abundance. On the other hand, the present results support the astrophysical models reproducing the abundance of the methanimine (CH_2NH) detected in massive star formation regions. In these models, the $CH_2NH_2^+$ DR is a major route of formation of this molecule with a high prebiotic potential. $CH_2NH_2^+$ and $NH_2CH_2O^+$ are the largest molecular ions for which the DR process was studied theoretically.

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