

Abstract Submitted
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Formation of carbon chain molecular anions by radiative electron attachment and their destruction by photodetachment¹ MARJAN KHAMESIAN, University of Central Florida, Orlando, FL, NICOLAS DOUGUET, Drake University, Des Moines, IA, MAURICE RAOULT, OLIVIER DULIEU, Laboratoire Aime Cotton, CNRS/Universite Paris-Sud/ENS-Cachan, Orsay France, VIATCHESLAV KOKOULINE, University of Central Florida, Orlando, FL — Several negative ions C_nH^- ($n = 4, 6, 8$), C_nN^- ($n = 1, 3, 5$) have been recently observed in the interstellar medium (ISM). A possible mechanism of formation is radiative electron attachment (REA). In this study we develop a first principle theoretical approach to study the REA and apply the approach to the formation of the negative molecular ions CN^- , C_2H^- , C_3N^- , C_4H^- , C_5N^- , C_6H^- , and C_8H^- . The theoretical approach is based on the UK R-matrix calculations. Cross sections and rate coefficients for formation of these ions by REA to the corresponding neutral radicals are calculated. There is no experimental data on REA of these ions. However, using a similar approach we have also calculated cross sections for photodetachment of the negative ions and compared the obtained results with available experimental data. The good agreement with photodetachment experimental data provides a confirmation that the REA cross sections obtained in this study is also reliable.

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