

Abstract Submitted
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Cross sections for radiative electronic attachment to the molecules of astrophysical interest¹ MARJAN KHAMESIAN, University of Central Florida, Orlando, FL, NICOLAS DOUGUET, Drake University, Des Moines, IA, MAURICE RAOULT, Laboratoire Aime Cotton, CNRS/Universite Paris-Sud/ENS-Cachan, Orsay France, VIATCHESLAV KOKOOLINE, University of Central Florida, Orlando, FL — Several negative ions C_nH^- ($n = 4, 6, 8$) and C_nN^- ($n = 1, 3, 5$) have been recently observed in the interstellar medium (ISM). A possible mechanism of their formation is radiative electron attachment (REA). We have developed a first-principle theoretical approach to study REA applying it to the formation of the following negative molecular ions: CN^- , C_2H^- , C_3N^- , 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 are also reliable. The present study suggests that the studied negative ions are unlikely be formed by REA in the ISM.

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