

Abstract Submitted
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Formation of negative molecular ions $M\text{H}^-$ in the interstellar medium by radiative association of a molecule M and an H^- ion¹ M. AYOUZ, Dep. of Chemistry, Marquette University, O. DULIEU, M. RAOULT, S. GALTIER, Laboratoire Aime Cotton, CNRS, U. Paris Sud, Orsay, I. MIKHAILOV, V. KOKOOLINE, Dep. of Physics, U. Central Florida — We consider if negative molecular ions of the type $M\text{H}^-$ can be formed in the interstellar medium by radiative association of the negative hydrogen ion H^- (RAH^-) to a molecule M . For this goal, we consider the CO and H_2O molecules, which are abundant in the ISM, as candidates for M . We have determined *ab initio* potential energy surfaces and dipole moments for COH^- and H_3O^- ions. The two molecular ions are bound. We will present a preliminary estimation of the rate coefficients of RAH^- to H_2O and CO. We have also determined rotational constants of COH^- and H_3O^- ions that allows us to construct theoretical IR spectra for these ions. Previously, we have found that IR absorption frequencies for H_3^- are out of range of the orbital telescopes, but the IR absorption spectra for COH^- , and H_3O^- are within the range of wavelengths of Herschel telescope, which could be used to detect such ions. An eventual observation of $M\text{H}^-$ would indicate that the H^- ion is also present in the interstellar medium.

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