Quantal determination of the mobility of ground and excited C^+ ions evolving in a cooled helium gas

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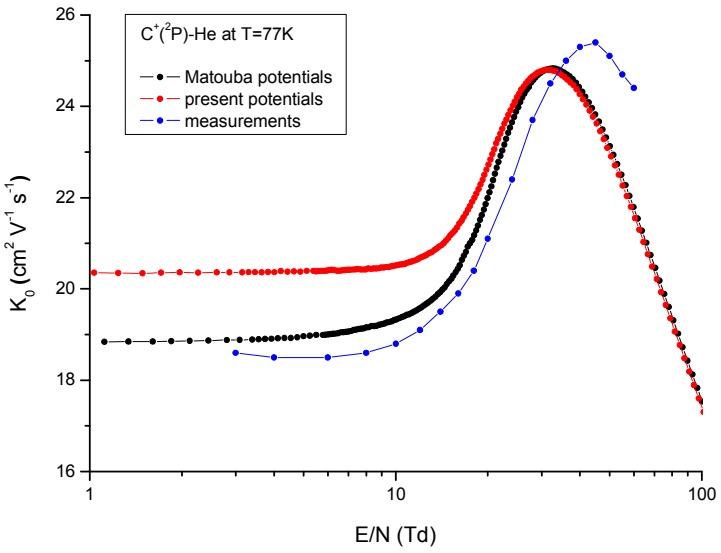
We propose in this work to look at the mobility of C^+ ions moving in a neutral helium gas. The calculations are performed for the cooled buffer gas into three steps. The first step consists of calculating the interaction potentials corresponding to the dimers which dissociate into $C^+(^2P)$-$He(^1S)$ and $C^+(^4P)$-$He(^1S)$. This task is accomplished with MOLPRO. Then, following the suggestions stated in a recent paper [1], we compute the energy-dependent thermophysical cross sections by using a full quantum-mechanical method, which yields in particular the quantal phase shifts. The final step aims at the use of the computed cross sections within the Viehland GRAMCHAR FORTRAN code [2, 3] to get the mobility of the ions at fixed temperatures. The preliminary results are shown in the figure below.



References:
[1] S. Matouba, H. Tanuma, and K. Ohtsuki, J. Phys. B **41,** 145205 (2008).
[2] L. Viehland, Chem. Phys. **179,** 71 (1994).
[3] L. Viehland, private communications.