

Abstract Submitted
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Mobility of O^+ in He, Ne and Ar and Interaction Potentials of HeO^+ , NeO^+ and ArO^+ DANIEL DANAILOV, Chatham College, Science Division, Pittsburgh, PA 15232, LARRY VIEHLAND, Chatham College, Science Division, RAINER JOHNSEN, University of Pittsburgh, Department of Physics, Pittsburgh, PA 15260, TIMOTHY WRIGHT, University of Nottingham, UK, EDMOND LEE, University of Southampton, UK and Hong Kong Polytechnic University — New experimental measurements are reported for the mobility of O^+ ions in He, Ne and Ar gases at 300 K. The accuracy of these new values is estimated as $\pm 2.5\%$, which allows them to serve as a stringent test of new *ab initio* potentials that we have calculated using the RCCSD(T) method. We employed the aug-cc-pV5Z basis set with counterpoise corrections and took spin-orbit coupling into account. The present experimental values for O^+ in He lie below the calculated ones, but the difference becomes statistically significant only at moderate and high values of the ratio of the electric field strength to the gas number density; even there they are only marginally significant. For O^+ in Ne the experimental values lie clearly below the theoretical curve and for O^+ in Ar the ion mobility dependence has clear minima in addition to the maximum shown in the other rare gases.

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