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Direct Determination of He-O+ Interaction Potential from Gaseous Ion Mobility Data AMIR-HOSSEIN JALILI, NASER SEYED-MATIN, Gas Research Division, Research Institute of Petroleum Industry, Tehran, Iran, P.O. Box: 14857 — The analysis of charged particle transport in gases under the influence of electric fields has widespread applications in science and technology ranging from swarms experiments used to determine ion-neutral interaction cross-sections/potentials to plasma chemistry and atmospheric physics. In the last fifty years it has become possible to make accurate measurements of the mobility of trace amounts of ions through a neutral gas over a wide range of the ratio of electric field strength, E, to the neutral gas number density, N. In the 1970s the required theories has developed sufficiently to permit to obtain accurate information about ion-neutral potentials from analysis of such measurements. Here the direct inversion scheme of Viehland and co-workers is used to calculate the interaction potential of He-O+ from recently published gaseous ion mobility data for this system. The obtained potential (INVERT potential), which is in good agreement with the ab initio potential of Danailov and co-workers was employed to compute the ion mobility of O+ ion in He gas as a function of E/N ratio by the two temperature theory of Viehland and Mason. Results show that the INVERT potential reproduces the ion mobility within experimental accuracy.

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