THE INFRARED SPECTRA OF $HCOOH^+$ AND $HOCO^+$ TRAPPED IN SOLID NEON

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The $HCOOH^+$ cation has been trapped in solid neon by the codeposition of either a Ne:HCOOH or a Ne:H_2:CO_2 sample with a beam of neon atoms that have been excited in a microwave discharge. Four of the vibrational fundamentals of that species have been identified by comparing the positions, intensities, and isotopic substitution shifts of the observed absorptions with those which result from B3LYP/cc-pVDZ calculations. These results, taken together with complementary ones from a recent photoelectron spectroscopic study of HCOOH, provide an almost complete identification of the vibrational fundamentals of ground-state $HCOOH^+$. Relatively weak absorptions of the $HOCO^+$ cation are also obtained in the Ne:HCOOH studies, and more prominent absorptions in the Ne:H_2:CO_2 studies. Similar procedures have yielded identifications for three of the vibrational fundamentals of that product. Of these, the OH-stretching fundamental is significantly perturbed by interaction with the neon matrix, but the two other, previously unidentified fundamentals are expected to experience only small matrix perturbations.