THE INFRARED SPECTRUM OF $C_2H_4^+$ TRAPPED IN SOLID NEON

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When a mixture of C_2H_4 in a large excess of neon is codeposited at 4.3 K with a beam of neon atoms that have been excited in a microwave discharge, the infrared spectrum of the resulting solid includes absorptions of $C_2H_4^+$. Experiments using isotopically substituted ethylene and density functional calculations support the proposed assignment, which is consistent with recent gas-phase threshold photoelectron spectroscopic observations. Evidence for the stabilization of other products, including the uncharged vinyl radical, will also be presented.