

ELECTRON SPIN RESONANCE (ESR) STUDIES OF NEON MATRIX-ISOLATED $(\text{HF})_2^-$ AND $(\text{DF})_2^-$ DIMER RADICAL ANIONS: VALENCE OR DIPOLE-BOUND?

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Electron spin resonance (ESR) spectroscopic studies of the hydrogen halide dimer anion radicals $(\text{HF})_2^-$ and $(\text{DF})_2^-$ are presented. These paramagnetic species were created from the parent HF and DF gases using a rare gas microwave discharge, and trapped in neon matrices at 4 K. Whether the matrix-isolated radicals are conventional valence anions or have dipole-bound character is not fully known, but $(\text{HF})_2^-$ exists in the gas phase only as a dipole bound anion. This study of the dimer anions represents the first observation of $(\text{HF})_2^-$ outside the gas phase or isolated in any matrix, and the first observation of $(\text{DF})_2^-$ by any means.