ELECTRON SPIN RESONANCE SPECTROSCOPY STUDIES OF RADICAL IONS TRAPPED IN PARA-HYDROGEN MATRICES

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The ability to trap atomic cation radicals in para-hydrogen at 2K for ESR (electron spin resonance) studies has been demonstrated for the first time in a series of recent experiments in our laboratory. Comparative magnetic parameters (g and A tensors) for $^{25}Mg^+$, $^{67}Zn^+$ and $^{199,201}Hg^+$ have been measured in neon, argon, krypton, and p-H_2 matrices. The cations were generated by pulsed laser ablation of the metals, x-irradiation or by a neon discharge photoionization source at 16.8 eV. Atomic hydrogen lines were observed to have unusually narrow linewidths in p-H_2, in agreement with earlier findings reported by other investigators. The relative intensity of satellite transitions seems to reflect the degree of conversion from n-H_2 to p-H_2.