MATRIX ISOLATION ESR (ELECTRON SPIN RESONANCE) STUDIES OF $Co(O_2)$ IN QUARTET AND SEXTET GROUND SPIN STATES

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Two different geometric structures have been found for cobalt dioxygen radicals in neon, argon and krypton matrices at 4 K. These superoxide complexes have quartet and sextet ground states and both exhibit $^{59}Co(I = 7/2)$ octet nuclear hyperfine structure. A $^2\Sigma$ ground state has been previously found for the cobalt dioxide (OCoO) radical based on rare gas matrix ESR investigations[a]. The high spin cobalt radicals reported here have been generated by conventional Knudsen oven vaporization of cobalt metal with trace amounts of oxygen and independently by pulsed laser ablation of the metal.

[a] R. J. Van Zee, Y. M. Hamrick, S. Li, and W. Weltner, Jr. *J. Chem. Phys.* **96**, 7247 1992.