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Spin Resonance Spectroscopy: Principles and applications

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Applications of Electron Paramagnetic Resonance (Book Chapter)

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Abstract

This chapter focuses on the applications of electron paramagnetic resonance (EPR) to transition metal complexes of d^1 ions including Ti^{3+}, Mo^{5+}, V^{4+}, d^3 ion Cr^{3+}, EPR of Mn^{2+} and parallel mode EPR of Mn^{3+}, EPR of interconversion of low-spin to high-spin iron complexes and rhombogram for its ground state, iron-sulfur exchange coupled clusters and heme containing proteins, EPR of low spin, high-spin octahedral and tetrahedral $Co^{2+/3+}$ complexes, and EPR of Nickel in+2,+3 and+1 oxidation states. EPR of Cu^{2+} and its proteins and Jahn-Teller coupling and its types viz., static and dynamic Jahn-Teller distortions, temperature dependence of Jahn-Teller effect, structural elucidation of bis-salicylaldimine-Cu(II) are discussed. Fast-flow, rapid freeze-quench EPR to direct monitoring of free radicals and indirectly by spin traps, types, and applications of spin traps are presented. Electron spin resonance spin labeling, dosimetry, imaging, spin probes in EPR imaging, invivo EPR imaging, Overhauser enhanced magnetic resonance imaging, and proton electron double resonance imaging are also described.

Author keywords

EPR imaging | EPR of transition metal ions and their proteins | Fast-flow and rapid freeze-quench EPR | Rhombogram | Spin labeling | Spin traps

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