

## Book Review

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### Fluxional Organometallic and Coordination Compounds

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The text contains a variety of different topics related to the dynamic behavior of metal-containing compounds and is a great asset to scientists who synthesize and characterize inorganic and organometallic complexes.

The first chapter contains an excellent discussion of polyhedral isomerization, including a thorough coverage of diamond-square-diamond rearrangements and the use of Gale diagrams to explain dynamic processes for polyhedra with a small number of vertices. The chapter also contains a discussion of Jahn Teller effects for complexes with  $D_{4h}$ ,  $O_h$ , and  $I_h$  symmetries.

Fluxional organoboranes and a number of transition metal complexes are discussed in Chapters 2 and 3. The heavy emphasis on NMR spectroscopy in these sections is appropriate due to the impact that this single technique has had on investigations of dynamic behavior. An attractive aspect of these chapters is the inclusion of a number of EXSY (Exchange Spectroscopy) spectra and an explanation of how to determine activation parameters using the intensities of

the peaks found in the two-dimensional spectrum. Variable-temperature NMR spectroscopy is also highlighted and used to explain borotropic migration in cycloheptatrienylborane as well as other organoboranes.

Owing to the importance of chiral chelating ligands in asymmetric synthesis, the conformational mobility of chelated square-planar complexes is of current interest. Chapter 4 covers this topic and gives an excellent overview of the critical factors related to the observed dynamic behavior of four-coordinate planar complexes. Although there are a number of reviews that cover the isomerization mechanisms of square-planar complexes containing monodentate ligands, the chapter by Espinet provides a thorough coverage of chelated complexes.

The solution dynamics of metallodrugs is an important area of research because the metal complex is often influenced or altered by species present in biological tissues (Chapter 5). This section summarizes classic and current explanations related to a number of bioactive compounds such as metal-based anticancer drugs, gold anti-arthritis agents and MRI contrast agents. Of particular interest is the use of one- and two-dimensional  $^{51}\text{V}$  NMR spectroscopy to investigate vanadium-based antidiabetic mimetics.

The investigation of dynamic processes using electron paramagnetic resonance and muon spectroscopy are the subjects of Chapters 6 and 7. The authors do a good

job of introducing the fundamentals of these techniques as well as the details that are critical for successfully carrying out an investigation. Each chapter contains a section that gives the reader the background necessary to predict whether or not a specific problem could be studied using these techniques.

The application of inelastic neutron scattering to proton dynamics in the solid state is the subject of Chapter 8. A brief discussion of the theory and techniques is followed by a series of examples including  $\text{KHCO}_3$  dimers and dihydrogen metal complexes. Also included in this section is the application of a single methyl rotor model to explain the rotational dynamics of  $\text{Ni}(\text{NH}_3)_6\text{Cl}_2$  and related complexes.

In summary, each chapter contains a representative sampling of fluxional molecules and a comprehensive reference list for further study. Through the use of numerous examples, the reader will learn how to recognize and interpret the dynamic behavior of metal-containing compounds.

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