

Book review

Olivier Kahn (1993) *Molecular Magnetism*, VCH Publishers, New York, DM 154,-

The magnetic properties of molecules, in particular of transition metal complexes containing one, two or more metal ions with partially filled *d*-shells, constitute one of the most fascinating fields in modern inorganic chemistry. Apart from their importance for basic research in coordination chemistry, they play a central role in many fields of application, ranging from enzyme kinetics in biological systems to the design of molecular magnets and molecular electronics in material science. In the present monograph, a comprehensive, very competent up-to-date overview of the current knowledge in the whole field of molecular magnetism is given with particular emphasis on the theoretical interpretation of the experimentally observed phenomena.

After a short introductory chapter in which the basis properties – magnetization, susceptibility, magnetic moments – are defined, the book starts with the discussion of molecules containing one single magnetic center, both with spin-only magnetism and with spin and orbital angular momenta (Chapters 2–5). Effects such as spin-orbit coupling, zero-field splitting, low-spin-high-spin transitions, distortions of the ligand field, and their interrelations are treated in great detail. A large part of the book (Chapter 6–10) is devoted to dinuclear and polynuclear compounds, to the different types of interaction and coupling between local magnetic centers, in particular to the phenomenon of superexchange through an intermediate non-magnetic ion, to correlations between geometrical structures and magnetism, and to the phenomenon of spin-frustration. Finally, the last three chapters treat systems with many magnetic centers: magnetic chain compounds, three-dimensional long-range magnetic ordering and mixed-valence compounds.

The reader who has to be familiar to a certain extent with the basic principles of ligand-field theory, group theory, molecular orbital theory and thermodynamics will follow the thorough discussion of the many experimental observations of magnetic properties of molecules with great pleasure. As far as possible, Prof. Kahn tries to avoid complicated formal theories, which are understandable only to the specialists, in favor of clear and lucid examples, but on the other hand, he always presents a solid theoretical interpretation of the observed facts, mostly based on MO-type arguments and – if available – on *ab initio* calculations. (The colleagues from Quantum Chemistry will be particularly pleased learning that many experiments in the field of molecular magnetism cannot be understood – neither qualitatively nor quantitatively – without the help of quantum chemical theories.) The book of Prof. Kahn can be warmly recommended as a comprehensive overview to all scientists who are working in the field of molecular magnetism or intend to become acquainted with this subject.

Unfortunately, the book contains an incredibly large amount of misprints, typing errors, misspelled names, errors in formulas etc. A little more care would have been appreciated, but this does not lower the value of Prof. Kahn's excellent presentation of the fascinating field of the magnetic properties of molecules.

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