

Book Reviews

Magnetism and Transition Metal Complexes

F. E. Mabbs and D. J. Machin

Chapman and Hall, London, 1973; 206 pp.; 76 figures; price £ 3.60.

The volume is intended as an introduction to the theory of magnetic properties of transition metal complexes. In the first chapter, the types of magnetic behaviour are discussed and the basic quantities are defined. There follows an account of the Slater theory of free ions, the crystal field theory and an outline of perturbation theory. The next two chapters form the heart of the book. In chapter four, the theory of magnetic properties of transition metal ions in cubic crystal fields is presented in detail, chapter five containing the corresponding treatment in axially symmetric crystal fields. This is followed by a comparison of experimental and calculated data and a treatment of the magnetic properties of polynuclear transition metal complexes.

The theoretical methods dealt with in the volume are based on the well-known work of Griffith, Figgis and others. Some criticism seems to be here a propos. With the advent of liquid cryogenics in the magnetochemical laboratory, saturation effects in paramagnetism cannot be neglected. The resulting field

dependence of magnetic susceptibility is not treated here. Configuration interaction is considered only with respect to one specific state or it arises in terms of the overall TIP contribution. Again, considerable differences have been recently encountered between the complete treatment and that based exclusively on the ground state. These effects should be considered particularly in work at cryogenic temperatures.

Finally, numerous complexes of other than axially distorted octahedral symmetry have been synthesized and their magnetic properties have been studied which are not covered in the present volume.

Despite these shortcomings, the book certainly fills a gap as an introduction to the theory of magnetism. All theoretical methods are well explained and the algebra is treated in full detail. There should be no problem in proceeding from one equation to the next as is often found in other texts by those who are not familiar with the field. The text is well printed, the number of misprints which came to the reviewer's attention is small and yet the price is moderate. The volume should be recommended to all those looking for an easily comprehensible introduction to the field.

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