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| 课程名（Coursename） Magnetic Materials  课程代码（Coursenumber） M3  课程对象（Audience） Graduates  开课教师（Teacher） Dr J. M. Rawson and Dr P. T. Wood  学期（Semester）  课程描述（Description） The course will describe the magnetic properties of molecular solids and extended networks and show how unusual properties can be rationalised from knowledge of the compounds’ structures. The material will be illustrated by real examples and the course will progress from fundamental theory to the most up-to-date topics in molecular magnetism such as the search for highly efficient data storage compounds using clusters and chains. Topics Fundamental properties in magnetism; diamagnetism, paramagnetism and magnetic susceptibility. Magnetic properties of isolated ions; understanding the behaviour of first-row transition metals and lanthanides including the van Vleck equation to model their magnetic behaviour; An introduction to magnetic anisotropy focusing on single ion anisotropy and its evaluation by electron paramagnetic resonance spectroscopy.  Magnetic properties of clusters; Communication between unpaired electrons via direct exchange and superexchange pathways; models for the magnetism of clusters using Kambe’s vector coupling approach; single molecule magnets. Magnetic properties of extended networks; ferro-, ferri- and antiferromagnetism; molecular field theory. Exotic types of ordering such as metamagnetism, canted antiferromagnetism and spin flop phases. Spin frustration and spin glasses. Single chain magnets. Characterisation methods such as magnetic resonance techniques, heat capacity measurements, neutron diffraction leading to magnetic phase diagrams.  课时信息（Totalhours）  教参信息（Textbookinfo） 1 Introduction to Magnetic Materials by B. D. Cullity and C. D. Graham (Hardcover - Dec. 10, 2008) ISBN-13: 978-0471477419 世界各地拥有馆藏的图书馆（OCLC）:171 2 Magnetic Materials: Fundamentals and Device Applications by Nicola A. Spaldin (Paperback - Apr. 21, 2003) ISBN-13: 978-0521016582 世界各地拥有馆藏的图书馆（OCLC）:260 3 Magnetism and Magnetic Materials by Coey J. M. D. (Hardcover - Apr. 26, 2010) ISBN-13: 978-0521816144 世界各地拥有馆藏的图书馆（OCLC）:80 4 Functional Materials: Electrical, Dielectric, Electromagnetic, Optical and Magnetic Applications, (With Companion Solution Manual) (Engineering Materials for Technological Needs) by Deborah D. L. Chung (Paperback - May 30, 2010) ISBN-13: 978-9814287166 世界各地拥有馆藏的图书馆（OCLC）:32 5 Processing of Magnetic Materials by Oliver Gutfleisch (Hardcover - Aug. 12, 2005) ISBN-13: 978-3527305339 世界各地拥有馆藏的图书馆（OCLC）:4 6 Magnetic Properties of Antiferromagnetic Oxide Materials: Surfaces, Interfaces, and Thin Films by Lamberto Du&#242;, Marco Finazzi, and Franco Ciccacci (Hardcover - June 21, 2010) ISBN-13: 978-3527408818 世界各地拥有馆藏的图书馆（OCLC）:13 7 Thermoelectric Power in Nanostructure Materials: Strong Magnetic Fields (Springer Series in Materials Science) by Kamakhya Prasad Ghatak and Sitangshu Bhattacharya (Hardcover - June 29, 2010) ISBN-13: 978-3642105708 世界各地拥有馆藏的图书馆（OCLC）:3 8 Molecular Materials (Inorganic Materials Series) by Duncan W. Bruce, Dermot O'Hare, and Richard Walton (Hardcover - Sept. 7, 2010) ISBN-13: 978-0470986776 世界各地拥有馆藏的图书馆（OCLC）:7 9 Magnetics, Dielectrics, and Wave Propagation with MATLAB® Codes by C. Vittoria (Hardcover - Sept. 1, 2010) ISBN-13: 978-1439841990 世界各地拥有馆藏的图书馆（OCLC）:3 |