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| 课程名（Coursename） The Chemistry of Materials  课程代码（Coursenumber） B5  课程对象（Audience） Undergraduate  开课教师（Teacher） Prof. W. Jones and Dr M. J. Duer  学期（Semester） M 6–8 & L 1–3  课程描述（Description）） So far you have not had any specific lectures on materials (at least not within Chemistry Department courses). We are surrounded, however, by (and indeed ourselves composed of) materials that function because of their specific solid state structures - and that the properties of these solids are not just a result of the molecular structure of their constituents but more importantly ‘collective’ solid state effects. This course will examine a range of organic and inorganic materials and demonstrate their varied uses. We will, in particular, identify important structural features relevant to such areas as the pharmaceutical and petrochemical industries and to naturally occurring biomaterials such as bone. The underlying chemistry and properties will be shown to be often sensitive to the way that the constituent atoms and molecules are packed together. This aspect of solid state control will be examined in some detail. The control of crystal morphology is important in many applications, and this will be discussed in the context of templating crystal growth, both in Nature and in the laboratory, and of crystal engineering. Numerous important materials, including many found in Nature, are in fact inorganic-organic composites, and these will also be discussed in detail. From paracetamol to petrol to proteins to bone – the importance of the Chemistry of Materials will be explored in these lectures. 1–4 Polymorphism in molecular crystals and implications for solid-state reactivity. Impact on development of new pharmaceutical materials. Nature of intermolecular interactions and the hydrogen bond; implications for crystal structure. Crystal engineering. Supramolecular chemistry. Methods of studying materials I: XRD [WJ] 5–6 Introduction to inorganic-organic composites. Intercalation and formation of inorganic-organic composites. Ion exchange materials. Microporous aluminosilicates and zeolites. Applications of zeolites, especially in catalysis and shape selective control. [WJ] 7–8 Methods of studying materials II: solid-state NMR. Application to zeolites and silica in Nature. [MD] 9–12 Introduction to biomaterials. Organic biomaterials: structural proteins. Keratin (hair and fingernails) and collagen (bone and tendon); molecular structure and beyond. Molecular conformation and the influence of this on material properties. Inorganic-organic composite biomaterials: bone and silica in Nature. Molecular structure of bone. Templating of inorganic crystals in bone and elsewhere in Nature. [MD]  课时信息（Totalhours）  教参信息（Textbookinfo） 1 Introduction to Materials Chemistry by H. R. Allcock (Hardcover - Sept. 9, 2008) ISBN-13: 978-0849398131 世界各地拥有馆藏的图书馆（OCLC）:335 2 Introduction to Materials Chemistry by H. R. Allcock (Hardcover - Sept. 9, 2008) ISBN-13: 978-0470293331 世界各地拥有馆藏的图书馆（OCLC）:251 3 Kinetics of Materials by Robert W. Balluffi, Samuel M. Allen, and W. Craig Carter (Hardcover - Sept. 23, 2005) ISBN-13: 978-0471246893 世界各地拥有馆藏的图书馆（OCLC）:178 4 Materials Chemistry by Bradley D. Fahlman (Paperback - Dec. 28, 2009) ISBN-13: 978-9048175413 世界各地拥有馆藏的图书馆（OCLC）:1 5 The Physics and Chemistry of Materials by Joel I. Gersten and Frederick W. Smith (Hardcover - June 25, 2001) ISBN-13: 978-0471057949 世界各地拥有馆藏的图书馆（OCLC）:483 6 Chemistry of Hazardous Materials with MyFireKit (5th Edition) by Eugene Meyer (Hardcover - Aug. 14, 2009) ISBN-13: 978-0135041598 世界各地拥有馆藏的图书馆（OCLC）:42 7 Sol-Gel Materials: Chemistry and Applications (Advanced Chemistry Texts) by John D. Wright and Nico A.J.M. Sommerdijk (Hardcover - Dec. 21, 2000) ISBN-13: 978-9056993269 8 Introduction to the Physics and Chemistry of Materials by Robert J. Naumann (Hardcover - Dec. 22, 2008) ISBN-13: 978-1420061338 世界各地拥有馆藏的图书馆（OCLC）:182 9 Hazardous Materials Chemistry by Armando S. Bevelacqua (Paperback - Aug. 2, 2005) ISBN-13: 978-1401880897 世界各地拥有馆藏的图书馆（OCLC）:519 10 Analysis and Deformulation of Polymeric Materials: Paints, Plastics, Adhesives, and Inks (Topics in Applied Chemistry) by Jan W. Gooch (Hardcover - May 31, 1997) ISBN-13: 978-0306455414 |