程名（Coursename）
Solid Electrolytes

课程代码（Coursenumber）
M7

课程对象（Audience）
Graduates

开课教师（Teacher）
Prof. S. R. Elliott and Dr S. N. Taraskin

学期（Semester）

课程描述（Description）
This course is concerned with the motion of ions through solids, and it builds upon material given in the IB course Electronic Structure and Properties of Solids and the Part II course
Chemistry ofMaterials. Ions can move between sites only in defective solids: an introduction is therefore given of the types of disorder and the nature of defects that can occur in solids. A detailed description will be given of various aspects of ionic motion in solids: this relates to topics such as percolation, random walks on lattices, phase transformations, fractals etc. Experimental techniques for obtaining information about ionic transport in materials, such as electrical conductivity, radioactive-tracer diffusion, NMR and quasielastic neutron scattering, will be introduced. Finally, a discussion will be given of the various applications of ionically-conducting materials, including solid-state batteries, ion sensors and fuel cells
.Topics Structure of crystalline and disordered materials. Models and behaviour of defects in solids. The basics of diffusion. Examples of fast ion conductors: structure and transport properties. Models of ionic motion in solid electrolytes. Linear response theory: conductivity and diffusion. Lattice models for diffusion: mean-field approaches. Experimental probes of ionic diffusion. A.C. conductivity and percolation. Applications of solid electrolytes.

课时信息（Totalhours）

教参信息（Textbookinfo）
1 Solid Electrolytes: Materials, Properties and Applications by Stephen Hull (Hardcover - Jan. 11, 2011)
ISBN-13: 978-9048186822
世界各地拥有馆藏的图书馆（OCLC）:3
2 Basic Solid State Chemistry by Anthony R. West (Paperback - Aug. 10, 1999)
ISBN-13: 978-0471987567
3 Solid State Chemistry: An Introduction, Third Edition by Lesley E. Smart and Elaine A. Moore (Paperback - June 24, 2005)
ISBN-13: 978-0748775163
世界各地拥有馆藏的图书馆（OCLC）:513
4 Defects in Solids (Special Topics in Inorganic Chemistry) by R. J. D. Tilley (Hardcover - Oct. 20, 2008)
ISBN-13: 978-0470077948
世界各地拥有馆藏的图书馆（OCLC）:120
5 Advances in Solid Oxide Fuel Cells V (Ceramic Engineering and Science Proceedings) by Narottam P. Bansal and Prabhakar Singh (Hardcover - Nov. 23, 2009)
ISBN-13: 978-0470457542
世界各地拥有馆藏的图书馆（OCLC）:10
6 Modeling Solid Oxide Fuel Cells: Methods, Procedures and Techniques (Fuel Cells and Hydrogen Energy) by Roberto Bove and S. Ubertini (Hardcover - June 6, 2008)
ISBN-13: 978-1402069949
世界各地拥有馆藏的图书馆（OCLC）:31
7 High-temperature Solid Oxide Fuel Cells: Fundamentals, Design and Applications by S.C. Singhal and K. Kendall (Hardcover - Dec. 22, 2003)
ISBN-13: 978-1856173872
世界各地拥有馆藏的图书馆（OCLC）:116
8 Advanced Batteries: Materials Science Aspects by Robert A. Huggins (Hardcover - Dec. 10, 2008)
ISBN-13: 978-0387764238
世界各地拥有馆藏的图书馆（OCLC）:117
9 Advances in Solid Oxide Fuel Cells IV (Ceramic Engineering and Science Proceedings, Vol. 29, No. 5) by Prabhakar Singh and Narottam P. Bansal (Hardcover - Dec. 22, 2008)
ISBN-13: 978-0470344965
世界各地拥有馆藏的图书馆（OCLC）:38
10 Fuel Cell Technology: Reaching Towards Commercialization (Engineering Materials and Processes) by Nigel Sammes (Hardcover - Mar. 7, 2006)
ISBN-13: 978-1852339746
世界各地拥有馆藏的图书馆（OCLC）:138