Information Form for SJTU Graduate Profession Courses

Basic Information					
* Course Name	Crystal Defects				
* Credits	3	* Teaching Hours	48 1 =16		
* Semester	Fall	* Cross-semester?	No	Spanning over Semesters	
* Course Type	Program Core Course	* Course Type	Both full & part time students		
* Course Category	Specialized Course	Targeting Students	All graduates		
* Instruction Language	Chinese	Teaching Method	In class teaching		
* Grade	Letter grading	Exam Method	Written Exam		
* School					
Subject					
Person in charge	Name	ID	School	E-mail	
				chenke83@sjtu.edu.cn	

Extended Information	
* ( ) Course Description	200 - - ”
* English Course Description	The periodicity of the atomic arrangement in crystals is an important aspect to reveal the structural nature of the physical world. Meanwhile, the existence of crystal defects renders the material performance a variety of changes. Understanding the laws of the formation and evolution of defects is of great significance for material design, processing control and failure analysis. This course focuses on four types of typical microscopic defects, i.e. point, line, planar (including surface) and volume defects. Starting with the review of fundamental knowledge of crystallography (symmetry group, crystal space lattice, crystal diffraction effect, etc.), the classification, formation and motion of defects, as well as their effects on material performance will be expounded. Combining with the study of characterization of defects and its typical applications, students will learn to make use of the advantages of defects and avoid its disadvantages, deepen the understanding on the 'structure-texture-performance' relationship and form the ability to use the relationship flexibly.

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Syllabus

1.	1) 2) 14 Bravais 3) 230 4) 5) 6)	6	+
2.	1 2 3 4 5 6 7 8	8	+
3.	1 2 3 4 5 6 7	10	+
4.	1 2 3 4 5 6 7 8 9	14	+
5.	1 2 3 4 5 6	10	+

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English
Syllabus

Chapter	Content	Hours	Format
1. Crystal Structure	1) Fundamentals of group theory 2) 14 Bravais lattices and point groups 3) 230 space groups 4) Reciprocal lattice 5) Compounds catalog 6) Crystal lattice structures	6	Lecture + Assignment
2. Point defect	1 Thermodynamics of point defects 2 Equilibrium concentration of point defects 3 Measurement of vacancy	8	Lecture + Assignment

concentration
4 Configuration of point defects in crystals
5

	Mohamed Y. Sherif, Third Edition, CRC Press, 2009 4. Physical Metallurgy Principles, by Reza Abbaschian and Robert E. Reed-Hill, Third Edition, CL-Engineering, 1991 5. Recrystallization and Related Annealing Phenomena, by F.J. Humphreys and M. Hatherly, second edition, Pergamon, 2004 6. Electron Backscatter Diffraction in Materials Science, by Adam J. Schwartz, Mukul Kumar, Brent L. Adams, David P. Field; 2nd edition, Springer, 2009 7. Imperfections in Crystalline Solids, W. Cai, W.D. Nix, Cambridge University Press, 2016
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