

淡江大學 101 學年度碩士班招生考試試題

系別：化學工程與材料工程學系

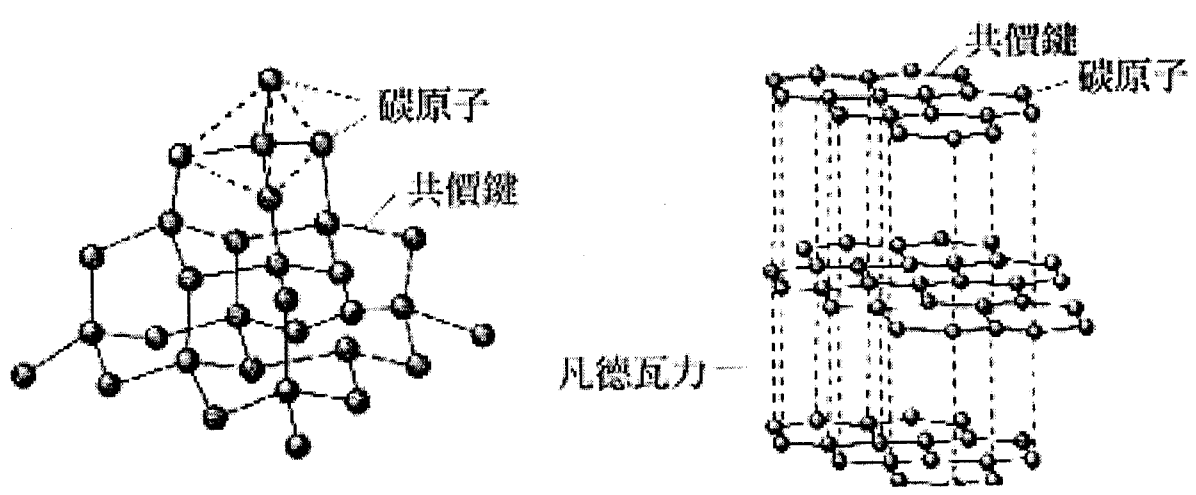
科目：材 料 科 學

考試日期：2月26日(星期日) 第2節

本試題共 7 大題， 2 頁

本試題雙面印刷

1. Please generalize what material is? Also, please list the categories of materials in detail and give an example to each category. (15 pts)
2. Please write down four kinds of crystal defects based on geometric shape and give an example to each kind. Besides, please describe advantages and disadvantages of material defects' application on materials. (15 pts)
3. Please calculate the c/a ratio and atomic stacking density (atomic packing factor) of the HCP crystal structure. (15 pts)
4. Use figures to help explain why materials in nature exist as a HCP (hexagonal close-packed) structure instead of as the hexagonal simple structure in the Bravais lattice system. (10 pts)
5. Please calculate and tell me whose planar density is bigger in FCC structure, face (111), face (100) or face (110)? Also, please describe the effect of planar density upon materials. (15 pts)
6. Both diamonds and graphite consist of carbon atoms and both of them are allotropes(同素異形體) of carbon elements. However, why they have different characters? Please refer to the figure below and discern between diamond and graphite. Please use figure to explain the differences of electric conductivity, thermal conductivity, and hardness between diamond and graphite. In addition, please explain what allotrope is and give an example to another allotrope of graphite. (15 pts)



背面尚有試題

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7. Please draw crystal faces in the BCC structure based on the results of X-ray diffraction. Meanwhile, please write how many atoms pass through the plane on these three facets. (Notice : All numbers are positive integer) (15 pts)

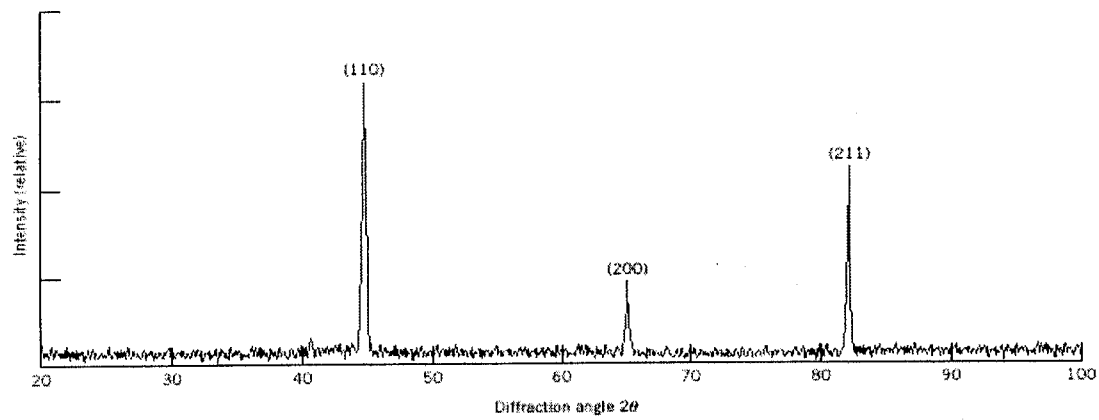


FIGURE 3.20 Diffraction pattern for polycrystalline α -iron.