

國立中央大學八十四學年度碩士班研究生入學試題卷

所別：化學研究所 組 科目：觸媒化學 共 1 頁 第 1 頁

參考用

1. What is catalyst? Will the equilibrium of the reaction be affected by using the catalyst? Why? (10 %)
2. What are homogeneous catalysis and heterogeneous catalysis? In what respects do proteins in solution resemble homogeneous and heterogeneous catalysts? (10 %)
3. What is volcano principle of heterogeneous catalysis? Explain. (10 %)
4. What are physical adsorption and chemical adsorption? What kind of adsorption is necessary for the heterogeneous catalysis? (10 %)
5. Two different molecules A and B are each adsorbed in obedience to the Langmuir isotherm, and reaction occurs between the two adsorbed molecules to give a non-adsorbing product. Show graphically
 - (a) how the rate varies with the ratio of θ_A to θ_B (θ is surface coverage)
 - (b) how the rate varies with P_A if P_B is kept constant? (10 %)
6. In the case of a reaction where it is desired to isolate an intermediate product in as high a yield as possible, would it be preferable to use a catalyst or support of high porosity or low porosity? If the latter, should the particles be large or small? (10 %)
7. What are zeolites? What are the special features of zeolite catalysis? (10 %)
8. What are the catalytic functions of VIII B metals, semiconducting oxides, and acids? (10 %)
9. Cite an example of homogeneous catalytic reaction and write down the possible mechanism. (10 %)
10. How to determine the total surface area, metal surface area (specific surface area), and dispersion of metal of a supported metal catalyst? (10 %)