

國立交通大學 107 學年度碩士班考試入學招生試題

科目：普通化學(3184)

考試日期：107 年 2 月 1 日 第 3 節

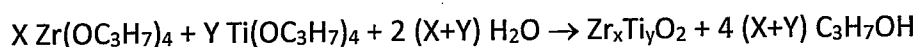
系所班別：環境工程研究所

組別：環工所乙組

第 1 頁, 共 1 頁

【可使用計算機】\*作答前請先核對試題、答案卷(試卷)與准考證之所組別與考科是否相符!!

1. Arrange HI, HCl, HBr, HF in increasing order of acidic strength and explain your answer. (10 points)
2. (a) Explain fundamentals of liquid-liquid and solid phase extraction. (10 points) (b) Explain the principle of microwave-assisted extraction and give advantages of the extraction over conventional methods. (10 points) (c) You are extracting acetic acid from water into hexane. Is it more effective to do one extraction with 300 mL, or three extractions each with 100 mL? Why? (5 points) Would the extraction be more effective if the pH was 3 or 8? Why? (5 points)
3. A  $Zr_{0.1}Ti_{0.9}O_2$  compound is prepared with two reagents,  $Ti(OC_3H_7)_4$  (Atomic weight of Ti: 48, density: 0.96 g/mL, purity:97%) and  $Zr(OC_3H_7)_4$  (Atomic weight of Zr:91, 70 wt.% in 1-propanol, 1.04 g/mL) through the following reactions. To prepare 1.0 g of  $Zr_{0.1}Ti_{0.9}O_2$  powder, how much should you take from these two reagents? (20 points)



4. Answer the questions relevant to polymers. (a) define polymers, monomers, initiators, and cross linkers, and give an example for each. (20 points) (b) If quantity of initiators increases in polymerization, will the chain length increase or decrease? Explain your answer. (6 points)
5. (a) Write electron configurations for Cu,  $Cu^+$ , and  $Cu^{2+}$ . (6 points) (b) Solutions of  $Sc^{3+}$  ions are colorless, but those of  $Ti^{3+}$  are violet. Why? (4 points) (c) How would transition metal ions be classified using the Lewis definition of acids and bases? (4 points)