

Chemistry 105 - Fundamental Chemistry

Fall Semester 1997 - Chemical Reactions and Stoichiometry

1) Hydrogen chloride, HCl, can be made conveniently in the laboratory by the reaction of NaCl with sulfuric acid. This reaction yields HCl(g) and Na₂SO₄ as products.

- (a) $2\text{NaCl}_{(s)} + \text{H}_2\text{SO}_{4(aq)} \rightarrow 2\text{HCl}_{(aq)} + \text{Na}_2\text{SO}_{4(aq)}$
- (b) 17.5g
- (c) 43%
- (d) 11g

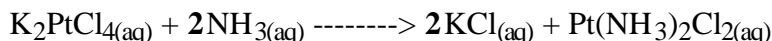
2) In a blast furnace, iron (III) oxide combines with carbon monoxide to produce iron metal and carbon dioxide.

- (a) 3.6 mol CO; 1.0×10^2 g
- (b) 1.70×10^2 g
- (c) 39.9kg
- (d) 71.5%

3) On April 16, 1947, the S.S. Grandchamp blew up in the harbor of Texas City, Texas, and the explosion set off a chain reaction of explosions and fires that eventually killed 570 people. The original blast was from the explosive decomposition of ammonium nitrate, a compound used as a fertilizer, to give nitrogen, oxygen, and water.

- (a) 1.05×10^4 T N₂; 5.99×10^3 T O₂; 1.35×10^4 T H₂O
- (b) 1.00×10^2 g
- (c) 63%

4) Pt(NH₃)₂Cl₂, called "cisplatin," has recently been found to be effective in treating certain types of cancers. It is synthesized by the following reaction:



With 1.00 g of K₂PtCl₄, how many grams of NH₃ must be used for complete reaction? How many grams of Pt(NH₃)₂Cl₂ will be produced? **0.0821g NH₃ 0.723g cisplatin**

5) $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$; 60.45lbs H₂; 340.4 lbs NH₃