Stoichiometric relationships in chemical reactions

Science, Chemistry

Stoichiometry is a section of chemistry that uses the relationship and/or products in a chemical reaction to determine quantities dated for reactants or products in a reaction. Stoichiometry can be used to find how much of a product can be produced from a certain amount of a reactant or how much of a reactant is needed to produce a given amount of product. Stoichiometric can also be used to find the limiting reactant in a chemical reaction. The limiting reactant in a reaction is the reactant that limits how much product can be made.

For example since a chemical formula is like a recipe for a reaction, the limiting reactant is like having enough eggs to make three cakes but only one box of cake mix. This means that any amount of product made us completely dependent on the amount of limiting reactant present. The formula for calculating the limiting reactant is grams of reactant present times one mole of reactant over molar mass of reactant times mole ratio of product to reactant (product/reactant) equals moles of product produced by amount of reactant present.

Both reactants are entered into this equation and the reactant that produces the least amount of product is the limiting reactant. The equation to find the theoretical yield of a product of a reaction is moles of product produced by limiting reactant react multiplied by molar mass of product over one mole of product equals theoretical yield of product in grams. (Science in Motion)
Procedure-

To begin the experiment, and reaction one, the mass of four pellets of NaOH was measured o the top loading balance, once measured the pellets were

put into a large test tube and the mass recorded in the data table for the first reaction on the hand out. After the mass of the NaOH was recorded, 1 scoop of CuCl2 was measured on the top loading balance and the mass recorded in the data table for reaction one, and then put into the same test tube as the NaOH.

Twenty-five milliliters of distillers water was then added to the test tube containing the NaOH and CuCl2, then stirred with a piper rod until all solids in the tube have dissolved. All observations were written in the observation section of the handout. Reaction two was started by recording the mass of one scoop of NaI and then putting it into test tube along with one small scoop of Pb(NO3)2, after the mass of both reactants were recorded in the data table for reaction two.

Just as in reaction one, twenty-five milliliters of distiller water was added to the test tube number two and a piper Rod was used to stir until all solids have appeared to dissolve. Then two pieces of filter paper were separately weighed and their mass recorded, then each one folded similarly to a coffee filter. Two Erlenmeyer flasks and funnels were then set up for gravity filtration of both solutions with the filter paper placed inside the cone of the funnel and the funnel tip placed inside the flasks. Both solutions were poured into the funnels to allow the precipitates of the reaction to filter out.

During the filtration process the experiment handout allowed an extra twenty-five milliliters of distiller water to be added to each of the test tubes to remove any residue of the products of the reaction left in the test tube. While waiting for gravity to filter the solution the limiting reactant and the

theoretical yield were calculated for the precipitant produced from both reactions. Once filtered the precipitants were left to dry overnight and weighed the next day and the percent yield calculated (Science in Motion).