5.8: Quantitative Information from Chemical Reactions

Much of green chemistry is involved with calculations of quantities of materials involved in chemical reactions. It is essential to do such calculations in order to deal with the important concepts of percent yield and atom economy. Fortunately, it is easy to calculate quantities of materials if a balanced chemical reaction is known along with the pertinent atomic and formula masses. Both energy (Section 5.9) and mass (Section 5.10) in chemical reactions can be calculated.

To this point, we have been viewing chemical reactions in terms of individual atoms and molecules and have been thinking of masses in atomic mass units, u, used to express the masses of individual atoms and molecules. But that is much too small a scale to use in the laboratory. The chemist conveniently deals with grams and moles where a mole of a substance (see Section 4.8) typically has a mass of several to several hundred grams. Much of the remainder of this chapter deals with quantitative information from chemical reactions. Energy changes in chemical reactions are addressed first followed by consideration of masses of reactants and products.