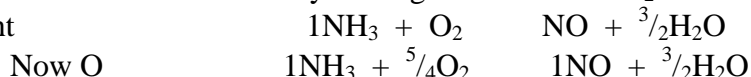


Hint 3 This is H. Balance H by writing $3/2$ in front of H_2O . 3H on left, therefore $(3/2) \times 2$ on right



The combustion of ethane: The products are carbon dioxide and water. Write the formulae for reactants and products,



Hint 1 Not applicable.

Hint 2 Leave O until last

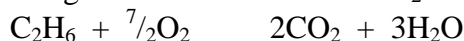
Hint 3 Could balance C or H next. Balance carbon, C, by writing 2 in front of CO_2 .



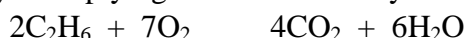
(2 C on both sides; 2 atoms in one molecule of ethane, C_2H_6 , and one atom in each of 2 molecules of carbon dioxide, CO_2 .) Now balance H. There are 6 H atoms on the left, so write 3 in front of H_2O .



(6 H atoms in ethane and 2 H atoms in each of 3 water molecules.) Balance O. There are 2 O atoms on left and 7 O atoms on right. Write $7/2$ in front of O_2 .



This would be interpreted as one molecule of ethane reacting with $3\frac{1}{2}$ molecules of dioxygen to give 2 molecules of CO_2 and 3 molecules of water. But one cannot have half a molecule. This problem is overcome by multiplying all coefficients by two.

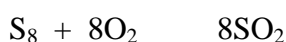


2 molecules of ethane react with 7 molecules of dioxygen to form 4 molecules of carbon dioxide and 6 molecules of water.

(In *section 8* another interpretation of the stoichiometric coefficient is given.)

Summary: A balanced chemical equation is a concise expression for conveying much information.

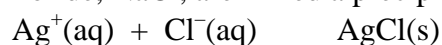
[e.g. the equation



implies

- (i) a molecule of sulfur contains 8 atoms of sulfur
- (ii) a molecule of oxygen contains 2 atoms of oxygen
- (iii) sulfur and oxygen react to form sulfur dioxide, each molecule of which contains one atom of S and 2 atoms of O (as the name suggests)
- (iv) one molecule of sulfur requires 8 molecules of dioxygen for a complete reaction.]

Nett ionic equation: A chemical equation for a reaction occurring in aqueous solution between ionic compounds, but showing only the reacting ions. [e.g. When solutions of silver nitrate, AgNO_3 , and sodium chloride, NaCl , are mixed a precipitate of silver chloride forms:



The Na^+ and NO_3^- ions present in solution are not shown because they are not reacting. Such ions are sometimes called spectator ions. The (aq) and (s) in the equation stand for aqueous and solid respectively and make the equation more meaningful.]

Nuclear equation: An equation for a nuclear change or reaction. [e.g. the production and decay of cobalt-60:



Normal cobalt, ${}^{59}\text{Co}$, absorbs a neutron (n) in a nuclear reactor to give ${}^{60}\text{Co}$ which decays with elimination of an electron from the nucleus to give ${}^{60}\text{Ni}$ with excess energy and this is