Limiting Reactant

$$2CuCl_{(aq)} + Mg_{(s)} \rightarrow MgCl_{2(aq)} + 2\ Cu_{(s)}$$

If reactants are mixed according to the **mole ratio** (stoichiometric amounts), there will be no leftover chemicals.

- this rarely happens in practice (sometimes extra reactants are added to speed up a reaction) – mainly due to **purity of chemicals**

Limiting Reactant: the reactant that **runs out first**. When used up, the reaction **stops**.

Ex 1. 1 frame + 2 wheels → 1 bike

a) If I have 6 frames and 11 wheels, what is the limiting reactant?

b) How many bikes can I make?

Ex 2. If 7.26 g of KNO3 is reacted with 9.50 g of Mg metal, what is the limiting reactant?

$2KNO_3 + 5Mg \rightarrow N_2 + K_2O + 5MgO$

Ex 3. a) If 11.5 g of Fe_2O_3 reacts with 2.63 x 10^{24} molecules of CO, what mass of Fe is expected? $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

b) What mass of excess reactant is there?

Ex 4. 4 mol of Mg and 3 mol of O_2 are reacted together to produce MgO.

a) Which reactant is limiting? Which reactant is excess?

b) How many moles of MgO will be produced?

Steps to Solving Limiting Reactant Problems (when given mass of reactants)