8. Hydrocarbons, Reversible Reactions

Students should:
(c) Gases in the atmosphere
2.9 know the approximate percentages by volume of the four most abundant gases in dry air
2.10 understand how to determine the percentage by volume of oxygen in air using experiments involving the reactions of metals (e.g. iron) and non-metals (e.g. phosphorus) with air
2.11 describe the combustion of elements in oxygen, including magnesium, hydrogen and sulfur
2.12 describe the formation of carbon dioxide from the thermal decomposition of metal carbonates, including copper(II) carbonate
2.13 know that carbon dioxide is a greenhouse gas and that increasing amounts in the atmosphere may contribute to climate change
2.14 practical: determine the approximate percentage by volume of oxygen in air using a metal or a non-metal

(b) Crude oil
Students should:
4.11 know that a fuel is a substance that, when burned, releases heat energy
4.12 know the possible products of complete and incomplete combustion of hydrocarbons with oxygen in the air
4.13 understand why carbon monoxide is poisonous, in terms of its effect on the capacity of blood to transport oxygen references to haemoglobin are not required
4.14 know that, in car engines, the temperature reached is high enough to allow nitrogen and oxygen from air to react, forming oxides of nitrogen
4.15 explain how the combustion of some impurities in hydrocarbon fuels results in the formation of sulfur dioxide
4.16 understand how sulfur dioxide and oxides of nitrogen contribute to acid rain

3.17 know that some reactions are reversible and this is indicated by the symbol ⇌ in equations

3.18 describe reversible reactions such as the dehydration of hydrated copper(II) sulfate and the effect of heat on ammonium chloride

3.19C know that a reversible reaction can reach dynamic equilibrium in a sealed container

Triple only:

3.20C know that the characteristics of a reaction at dynamic equilibrium are:

- the forward and reverse reactions occur at the same rate
- the concentrations of reactants and products remain constant.

3.21C understand why a catalyst does not affect the position of equilibrium in a reversible reaction

3.22C know the effect of changing either temperature or pressure on the position of equilibrium in a reversible reaction:

- an increase (or decrease) in temperature shifts the position of equilibrium in the direction of the endothermic (or exothermic) reaction
- an increase (or decrease) in pressure shifts the position of equilibrium in the direction that produces fewer (or more) moles of gas

References to Le Chatelier's principle are not required

8__Climate_Change_v2_0.pdf

7__Earth_s_Atmosphere_v2_0.pdf

3__Combustion_and_Alternative_Fuels_v2_0.pdf

2_Reactions_with_oxygen_noflash.pdf

2__Moving_equilibria__no_flash.pdf

1__Earth_s_Atmosphere.pdf

lesson_1_What_are_equilibria.pdf

3__Using_equilibria.pdf

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