

AQA GCSE Chemistry

Topic 9: Chemistry of the atmosphere

The composition and evolution of the Earth's atmosphere

Notes

(Content in bold is for Higher Tier only)



The proportions of different gases in the atmosphere

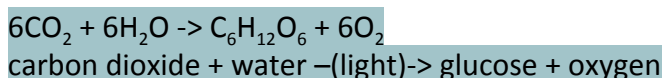
- For 200 million years, the proportions of different gases in the atmosphere have been much the same as they are today:
 - ~4/5 (80%) nitrogen
 - ~1/5 (20%) oxygen
 - Small proportions of various other gases, i.e. CO₂, H₂O(g) and noble gases
- ~ means around/approximately

The Earth's early atmosphere

- Evidence is limited because of the time scale of 4.6 billion years and theories have changed/developed over time
- One theory suggests that during the first billion years of the Earth's existence...
 - There was intense volcanic activity that released gases that formed the early atmosphere
 - At the start of this period, the atmosphere may have been like the atmospheres of Mars and Venus today: mainly CO₂ with little or no O₂(g)
 - Volcanoes also produced nitrogen (N₂) which gradually built up in the atmosphere & there may have been small proportions of methane (CH₄) and ammonia (NH₃)
 - Water vapour condensed to form the oceans
 - CO₂ dissolved in the water and carbonates were precipitated producing sediments, reducing the amount of CO₂ in the atmosphere
- this theory is the only theory of the early atmosphere you need to know

How oxygen increased

- Algae & plants produced the O₂ that is now in the atmosphere by photosynthesis



- Algae first produced oxygen about 2.7 billion years ago and soon after this oxygen appeared in the atmosphere
- Over the next billion years plants evolved and the % oxygen gradually increased to a level that enabled animals to evolve

How carbon dioxide decreased

- Algae and plants decreased the % CO₂ in the atmosphere by photosynthesis



- CO_2 was also decreased by the formation of sedimentary rocks that contain carbon (e.g. limestone and coal) and by the production of fossil fuels from the remains of dead plants and animals when they decayed

