Your notes

GCSE Chemistry: revision notes

The Earth's atmosphere

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Today's atmosphere

- For about 200 million years, the proportions of gases in the **atmosphere** have been much the same as today.
- It is about four-fifths (about 80%) **nitrogen** and about one-fifth (about 20%) oxygen, with small amounts of other gases including carbon dioxide, water vapour and noble gases (mainly argon).

The early atmosphere

- The Earth is about 4.6 billion years old, and evidence about the **early atmosphere** is limited, so theories have changed over time.
- One theory: in the first billion years, intense **volcanic activity** released gases that formed the **early atmosphere**, and water vapour condensed to form the oceans.
- The **early atmosphere** may have been like those of Mars and Venus today: mainly carbon dioxide, with little or no oxygen. Volcanoes also released **nitrogen**, which gradually built up, and there may have been small amounts of methane and ammonia.

How carbon dioxide decreased

- When the oceans formed, carbon dioxide dissolved in the water, and carbonates were precipitated, forming sediments.
- **Algae** and plants removed carbon dioxide by photosynthesis.
- Carbon was locked up in **sedimentary rocks** and **fossil fuels**: limestone formed from the shells and skeletons of marine organisms; coal formed from plants; crude oil and natural gas formed from plankton.

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How oxygen increased

- **Algae** first produced oxygen by photosynthesis about 2.7 billion years ago: carbon dioxide + water → glucose + oxygen.
- Over the next billion years plants evolved and the percentage of oxygen gradually increased to a level that let animals evolve.

Key terms

Atmosphere	The layer of gases surrounding the Earth.
Nitrogen	The most common gas in today's atmosphere, about 80%.
Early atmosphere	The atmosphere of the young Earth, mainly carbon dioxide from volcanoes.
Volcanic activity	Eruptions that released gases such as carbon dioxide, water vapour and nitrogen.
Sedimentary rock	Rock formed from layers of sediment, such as limestone.
Fossil fuel	A fuel formed from the remains of ancient organisms, such as coal, oil and natural gas.
Algae	Simple plant-like organisms that were the first to produce oxygen by photosynthesis.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What percentage of today's atmosphere is nitrogen?
2. What percentage of today's atmosphere is oxygen?
3. Which gas was probably most common in the early atmosphere?
4. Where did the gases of the early atmosphere come from?
5. How were the oceans formed?
6. What first produced oxygen in the atmosphere?
7. How did the oceans reduce carbon dioxide?
8. What was limestone formed from?

Answers

1. About 80%
2. About 20%
3. Carbon dioxide
4. Volcanoes
5. Water vapour condensed
6. Algae, by photosynthesis
7. It dissolved and formed carbonate sediments
8. The shells and skeletons of marine organisms

Your notes

What to do next

Practise 10 questions on this topic

Try 7 exam questions, with mark schemes

Read the lesson, one step at a time

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