Group discussion SW06
Environmental chemistry and biology
HSLU, Semester 1

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Contents

1 Partecipant

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2 Case of study: The Chemical Impact of Ocean Pollutants on Marine Ecosystems

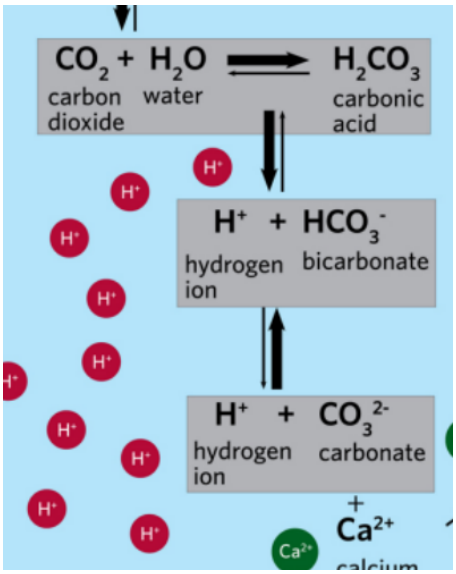
2.1 Question 1

How does increasing CO_2 concentration affect the oceans pH and marine life?

It forms the carbonic acid which breaks down to hydrogen ions and bicarbonate (HCO_3^-), which reduces the pH of the ocean.

Algaes consumes CO_2 due the photosynthesis.

$$H^+ + CO_3^{2-} \rightleftharpoons H^+ + HCO_3^-$$



2.2 Question 2

How does the structure of benzene contribute to its stability and persistence in the environment?

Benzene has double and single bonds. This property gives to the chemical a high stability.

Furthermore, having a high volatility, benzene remains in the atmosphere.

2.3 Question 3

How does this buffer system limit changes in pH, and why is it becoming less effective?

This system contains many CO_2 molecules that react with water, creating carbonic acid (H_2CO_3). Thus, the carbonic acid consumes carbonate (CO_3^{2-}) faster than it creates it.

Increased CO_2 in the environment leads to more carbon:

$$\boxed{CaCO_3 \rightleftharpoons Ca^{2+} + CO_3^{2-}}$$

2.4 Question 4

What chemical and engineering solutions could you propose to mitigate both CO2 and benzene pollution? – Name at least 3.

- Reduction in the use of CO_2-emitting products;
- Implementation of CO_2 capture devices in the environment and oceans;
- Reduction in the use of pollutants in product manufacturing;
- Bio-filtration with algae;
- Mitigation of CO_2 emissions through the creation of new renewable energy plants;
- Increase in the use of solar energy;
- Drastic reduction of deforestation and an increase in the number of trees planted;
- Preservation of natural sites.