CO2 Adsorption over the Alkali Metal-based Sorbents

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Natural CO2 Sources

- Volcanic Outgassing
  - Where the first bubble of CO2 is from on earth
- Respiration Process
  - on which all living organisms live

Man-Made CO2 Sources

- Burning of fossil fuels
  - Coal is the largest contributor (43%) to CO2 emissions
  - Future use of coal will likely increase
- Some industrial processes
  - e.g., cement making industry
- Volcanic Outgassing
  - Where the first bubble of CO2 is from on earth
- Respiration Process
  - on which all aerobic organisms live
• Burning of fossil fuels
  - Coal is the largest contributor (41%) to CO2 emission
  - Future use of coal will likely increase

• Some industrial processes
  - eg. cement making industry
CO2 Separation By Membrane

- Membrane allowing the selective permeation of CO2
- Driving force being the pressure difference
CO2 Separation By Membrane

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CO2 Separation by Cryogenic Distillation

- A series of cooling and compression steps
- Gases being separated in the column in the liquid form
CO2 Separation by Sorbent

Sorbent: K2CO3
Support: AlOOH

CO2 Capture

A + CO2

Sorbent + CO2

Refreshed Sorbent

CO2

Sorbent Regeneration
Experimental Apparatus Setup
Figure 1. Adsorption/desorption apparatus set-up

1. CO2-O2 mixture cylinder
2. SO2-NO mixture cylinder
3. N2 cylinder
4. Flowmeter
5. T-connector
6. Temperature controller
7. Water vapor generator
8. Glass tube
9. Quartz wool
10. Dry sorbent
11. Tubular furnace
12. Steam generator
13. Water vapor eliminator
14. Gas composition analyzer
15. Data recorder
Results

Adsorption

Desorption Curve

Desorption

CO₂ Concentration

Time
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TIME FOR QUESTIONS