

The contact process – production of sulphuric acid

- Sulphuric acid is a commercially important raw material
- It is manufactured from H_2O , air and sulphur
- Catalyst – V_2O_5
- Temperature – 450°C
- Pressure – 1-2 atm

Steps in the contact process

1. Formation of SO_2
 - $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$
2. Formation of SO_3 (the contact process)
 - $\text{SO}_2 + \text{O}_2 \rightarrow 2\text{SO}_3$ (an exothermic reaction)
 - The catalyst used in this is vanadium pentoxide
 - 1) $\text{V}_2\text{O}_5 + \text{SO}_2 \rightleftharpoons \text{V}_2\text{O}_4 + \text{SO}_3$
 - 2) $\text{V}_2\text{O}_4 + \frac{1}{2} \text{O}_2 \rightleftharpoons \text{V}_2\text{O}_5$
3. Formation of oleum
 - $\text{SO}_3 + \text{conc H}_2\text{SO}_4 \rightarrow \text{H}_2\text{S}_2\text{O}_7$
 - Reaction of water with SO_3 is too exothermic and forms a fine mist of acid, so they can't be directly reacted
4. Dilution of oleum
 - $\text{H}_2\text{O} + \text{H}_2\text{S}_2\text{O}_7 \rightarrow 2\text{H}_2\text{SO}_4$
 - The oleum is diluted to give the desired concentration of sulphuric acid

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