The contact process

- produces sulfuric acid

Stage 1: making sulfur dioxide

- combustion
- sulfur + oxygen → sulfur dioxide
- $S_{(s)} + O_{2(g)} \rightarrow SO_{2(g)}$

Stage 2: making sulfur trioxide

- sulfur dioxide + oxygen ⇌ sulfur trioxide
- $2SO_{2(s)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$
- needs a catalyst of vanadium(V) oxide (V_2O_5), temperature of around 450°C, atmospheric pressure

Stage 3: making sulfuric acid

- sulfur trioxide + water → sulfuric acid
- $SO_{3(g)} + H_2O_{(l)} \rightarrow H_2SO_{4(aq)}$
- SO_3 is absorbed in H_2SO_4 (98% H_2SO_4, 2% H_2O).
  SO_3 cannot be absorbed directly in 100% H_2O, as the reaction is violent and produces a mist of H_2SO_4.
  The SO_3 reacts with the small quantity of H_2O.

Uses of sulfuric acid

- the production of fertilisers
- paints
- dyes
- fibres
- plastics
- detergents