

Sulfuric Acid: Teacher Notes

Source of sulfur

At present, almost all the sulfur used for sulfuric acid manufacture in the UK comes from the desulfurisation of petroleum products in UK oil refineries (see the notes on that process). Almost none comes from Frasch wells or from mined sources.

Sampling and storage

Sampling of the sulfur is done for quality control purposes. The sulfur is kept liquid during storage by steam pipes within the storage tanks. The road tankers also have pipes which can be connected to a source of steam to liquefy the sulfur should it solidify in the tanker.

Catalyst

The catalyst used for conversion of sulfur dioxide to sulfur trioxide is based on vanadium pentoxide (vanadium(V) oxide) but also contains other substances, including alkali metal sulfates, as promoters. It is usually supplied in the form of tubes about 10 mm in outside diameter and about 20 mm long. These have a large surface area.

The absorbers

The absorption towers are packed with pieces of ceramic material in the shape of saddles. A film of acid coats these, giving a large surface area in contact with the gaseous sulfur trioxide.

Dilution

The water added to dilute the acid from 99% to 98% corresponds in volume to the daily output of the plant – about 600 tonnes

Pollution

0.5% of the original sulfur represents about 1 tonne per day of sulfur discharged from the stack – a useful calculation for students to do. Had the sulfur not been extracted from the oils originally, all the sulfur would have ended up in the atmosphere as sulfur oxides.