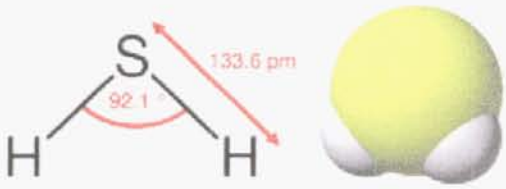
Hydrogen sulfide

From Wikipedia, the free encyclopedia

Hydrogen sulfide



General	
Systematic name	Hydrogen sulfide, sulfane
Other names	Sulfuretted hydrogen
Molecular formula	H_2S
Molar mass	34.082 g/mol
Appearance	Colorless gas.
CAS number	[7783-06-4 (http://www.emolecules.com/cgi-bin/search?t=ss&q=7783-06-4&c=l&v=)]
Properties	
Density and phase	1.363 g/L, gas.
Solubility in water	0.25 g/100 ml (40°C)
Melting point	−82.30°C (190.85 K)
Boiling point	−60.28°C (212.87 K)
Acidity (pK_a)	6.89 19±2 (*See Text*)
Structure	
Molecular shape	Bent.
Dipole moment	0.97 D
Hazards	
MSDS	External MSDS
Main hazards	Highly toxic, highly flammable.
NFPA 704	
Flash point	−82.4°C
	R: R12, R26, R50

Hydrogen sulfide is corrosive and renders some steels brittle, leading to sulphide stress cracking — a concern especially for handling acid gas and sour crude oil in the oil industry.

(Sulfides should not be confused with sulfites or sulfates, which contain the sulfite ion SO_3^{2-} and the sulfate ion SO_4^{2-}, respectively.)

Hydrogen sulfide burns to give the gas sulfur dioxide, which is more familiar to people as the odor of a burnt match.

Occurrence

Deposit of sulphur on a rock, caused by volcanic gases

Small amounts of hydrogen sulfide occur in crude petroleum but natural gas can contain up to 28%. Volcanoes and hot springs emit some H_2S, where it probably arises via the hydrolysis of sulfide minerals, i.e. $MS + H_2O$ to give $MO + H_2S$.

Normal average concentration in clean air is about 0.0001-0.0002 ppm.

Sulfate-reducing bacteria obtain their energy by oxidizing organic matter or hydrogen with sulfates, producing H_2S. These microorganisms are prevalent in low-oxygen environments, such as in swamps and standing waters. Sulfur-reducing bacteria and some archaea obtain their energy by oxidizing organic matter or hydrogen with elemental sulfur, also producing H_2S. Other anaerobic bacteria liberate hydrogen sulfide when they digest sulfur-containing amino acids, for instance during the decay of organic matter. H_2S-producing bacteria also operate in the human colon, and the odor of flatulence is largely due to trace amounts of the gas. Such bacterial action in the mouth may contribute to bad breath. Evidence exists that hydrogen sulfide produced