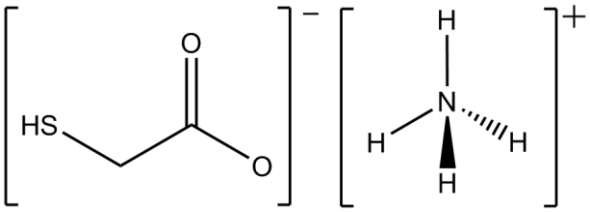
Chemical profile – Ammonium Thioglycolate

Basic information

IUPAC name: Ammonium thioglycolate
Other names: Ammonium mercaptoacetate
Molecular formula: $C_2H_7NO_2S$
Molecular weight: 109.15 g mol^{-1}



Physical properties

Appearance: Colourless to faint pink liquid
Relative density: 1.220 g cm^{-3}
Melting point: -70 °C
Boiling point: 115 °C
Flash point: 99.8 °C

Occurrence and uses

Ammonium thioglycolate, also known as 'perm salt' is used for perming hair.

Links to curriculum

Equilibria:

Ammonium thioglycolate in aqueous solution exists in equilibrium, with the equilibrium lying over to the left hand side (this can be pushed further to the left by addition of base*).

$$[HSCH_2COO]^-_{(aq)} + [NH_4]^+_{(aq)} \rightleftharpoons HSCH_2COOH_{(aq)} + NH_{3\,(aq)}$$

The disulfide bonds in hair are initially broken by thiolate ion:

$$R\text{-}S\text{-}S\text{-}R + 2[HSCH_2COO]^- \rightarrow {}^-OOCCH_2S\text{-}S_2HCCOO^- + 2R\text{-}SH$$

The disulfide bonds are then reformed by hydrogen peroxide when the hair is set:

$$2R\text{-}SH + H_2O_2 \rightarrow R\text{-}S\text{-}S\text{-}R + 2H_2O$$

See Learn Chemistry resource 'Chemistry in your cupboard: Veet'

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