

# Some reactions of ammonia

## Topic

Gases.

## Timing

20 min.

## Apparatus (per group)

- Student information sheet and worksheet
- One clear plastic sheet (eg ohp sheet)
- One 9 cm plastic petri dish (base + lid)
- One plastic pipette
- Scissors.

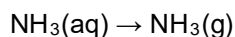
## Chemicals (per group)

Solutions contained in plastic pipettes, see 'Apparatus and techniques for microscale chemistry' handout- Ammonia solution  $3 \text{ mol dm}^{-3}$

- Full-range indicator solution diluted 1:1 with deionised water
- Copper(II) sulphate solution  $0.2 \text{ mol dm}^{-3}$
- Nessler's reagent (an alkaline solution of mercury iodide containing the complex ion  $\text{HgI}_4^-$ ).

## Method

Evaporation of ammonia gas from ammonia solution:



## Tests

1. Full-range indicator solution turns blue-green.
2. Copper(II) sulphate solution turns hazy and then develops deep blue streaks as the tetraamminocopper(II) ion is formed.
3. Nessler's reagent turns first yellow then brown. This is a very sensitive test for ammonia. The compound formed has the formula  $(\text{OHg}_2\text{NH}_2)\text{I}$  and consists of covalent metal-non-metal bonds which might provide an interesting point for subsequent class discussion.

## Health & Safety

Students must wear suitable eye protection (Splash resistant goggles to BS EN166 3) and gloves.

Nessler's reagent,  $(\text{K}_2\text{HgI}_4)$  is **extremely** toxic by all routes and contains mercury. It is also corrosive and toxic to aquatic life. Avoid contact with the skin and wash off quickly with water if this does occur.

Ammonia solution,  $3 \text{ mol.dm}^{-3} \text{ NH}_3 (\text{aq})$  is CORROSIVE.



Copper(II) sulphate solution,  $0.2 \text{ mol dm}^{-3}$ ,  $\text{CuSO}_4$  (aq) causes eye damage and is toxic to aquatic life.

Some formulations of universal indicator can still be flammable at a 1:1 dilution. Keep away from sources of ignition.

## Credits

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*Health & safety checked May 2018*

Page last updated August 2018

