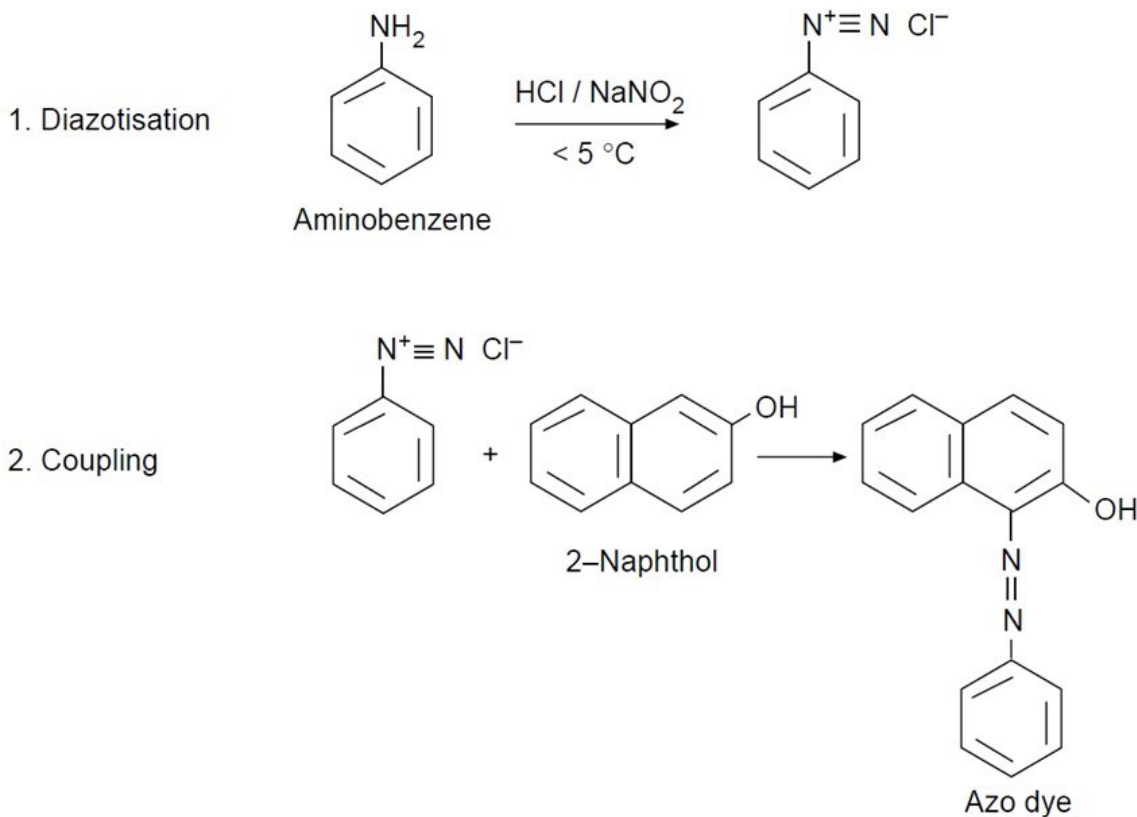


## The microscale synthesis of azo dyes – student sheet

In this experiment you will be synthesising an azo dye and using it to dye a piece of cotton. The reactions are:



### Instructions

1. Put eight drops of aminobenzene in a 10 cm<sup>3</sup> beaker and add 30 drops of deionised water followed by 15 drops of concentrated hydrochloric acid. Swirl the beaker and then put it in an ice bath.
2. Weigh 0.15 g of sodium nitrite into another beaker and add 1 cm<sup>3</sup> of deionised water. Cool the beaker in the ice bath. Add one spatula of urea (this prevents side reactions occurring).
3. Mix the contents of the two beakers together and keep in the ice bath.
4. Weigh 0.45 g of 2-naphthol into another beaker and add 3 cm<sup>3</sup> of sodium hydroxide solution. Swirl to dissolve.
5. Take a piece of cotton cloth 2 × 2 cm<sup>2</sup> and, using tweezers, dip it into the 2-naphthol solution. Allow the solution to completely soak the cotton.
6. Dip the cloth completely into the diazonium salt solution. A red dye forms in the fibres, dyeing the cloth.
7. Take the cloth out, wash it under the tap and leave to dry.

## Health and safety

- Students must wear suitable eye protection (splash resistant goggles to BS EN166 3).
- This experiment should be done in a fume cupboard.
- Aminobenzene (aniline) is TOXIC by all routes, a carcinogen and mutagen, a skin sensitiser, causes eye damage and is toxic to aquatic life.
- Hydrochloric acid, HCl(aq), is CORROSIVE and a respiratory irritant.
- Sodium Nitrite, NaNO<sup>2</sup> is an OXIDISER, toxic if swallowed and hazardous to aquatic life.
- 2-Naphthol is HARMFUL if swallowed or in contact with skin and toxic to aquatic life.
- Sodium hydroxide solution, 2 mol dm<sup>-3</sup> NaOH(aq), is CORROSIVE.
- Ethanol is highly FLAMMABLE.
- Urea is of low hazard