

Clarifying compounds and mixtures

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Technician notes

Kit

- Aluminium powder, 0.1 g (flammable)
- Iodine, 0.4 g (harmful in contact with skin and by inhalation)
- Weighing boats or small beakers
- Pestle and mortar
- Tin lid
- Washing up liquid
- Access to fume cupboard

Safety and disposal

Work in a fume cupboard away from naked flames. Wear eye protection. Avoid skin contact with iodine.

In the UK, do not exceed the suggested amounts unless the school has an explosives certificate issued by the police.

Wait until the mixture has cooled completely before soaking the tin lid or heat-resistant mat in water. (If hot, the mixture may produce hydrogen halide fumes on addition of water.)

Occasionally, the mixture fails to react (possibly because the aluminium is oxidised) or there is a very long period before it ignites. If it does not ignite, the mixture must be disposed of safely to prevent possible ignition after several hours. Add the solid to 1M sodium thiosulfate solution, which can be further diluted before being poured down a foul-water drain.

Preparation

Wear eye protection and work in a fume cupboard. Weigh out the aluminium and iodine into separate vessels. Use a small beaker or weighing boat, not paper, to measure out the iodine. Spilled iodine will rapidly corrode top pan balances. Grind the iodine to a fine powder with a pestle and mortar.

In front of the class

Show the two powders separately so the class gets a sense for the properties of the elements. Then, carefully mix the powders together (do not grind the mixture). Place the mixture on a clean tin lid or heat-resistant mat. No reaction will happen until a drop of water (with a touch of washing-up liquid added to assist wetting) is added to the mixture of powder. After a short time, the reaction heat sublimes the iodine. Large quantities of purple iodine vapour will appear and the mixture will change to a pale yellow/cream colour.

For more spectacular demonstrations, take a look at the Exhibition Chemistry archive on the Education in Chemistry website: <https://eic.rsc.org/exhibition-chemistry>