

## Unsaturation test with potassium manganate(VII) – teacher notes

In this experiment, students use a solution of potassium manganate(VII) in propanone to detect whether an organic compound is unsaturated.

The propanone solution is made up and stored in a plastic pipette, and mixes easily with non-polar organic compounds such as cyclohexane, cyclohexene and limonene.

Unsaturated compounds will turn the solution a brownish colour as the manganese(VII) is reduced to manganese(IV).

### Timing

20 minutes

### Equipment

#### Apparatus

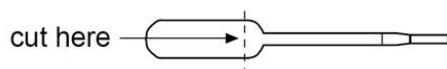
- Eye protection
- Plastic pipettes
- Plastic Petri dish
- Beaker, 10 cm<sup>3</sup>
- Scissors

#### Chemicals

- Propanone
- Potassium manganate(VII) crystals
- Cyclohexane
- Cyclohexene
- Limonene

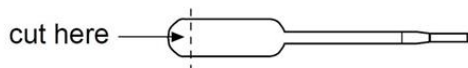
### Procedure

1. Cut the end off a plastic pipette as shown below and place the cup in a glass beaker or test tube.



2. Carefully add a few crystals of potassium manganate(VII) to the cup.

3. Add propanone to the cup until it is about half-full. You will notice that the potassium manganate(VII) dissolves to give a purple solution. Is it surprising that potassium manganate(VII) dissolves in an organic solvent?
4. Cut the ends off three pipettes to make small reaction vessels as shown below and place them in the lid of a plastic Petri dish.



5. Using a plastic pipette, add four drops of the potassium manganate(VII) in propanone solution to each of the reaction vessels.
6. Put three drops of each of the organic liquids under test in the reaction vessel and observe any changes over the next few minutes.
7. Mop up the liquid with tissue paper when you have finished.

### Health, safety and technical notes

- Read our standard health and safety guidance (<https://rsc.li/3yKPgKL>).
- Wear eye protection throughout.
- Avoid sources of ignition.
- Propanone is HIGHLY FLAMMABLE. See CLEAPSS Hazcard HC085A.
- Potassium manganate(VII) is an OXIDISER and IRRITANT, and stains glass, plastic, clothing and skin. Avoid direct contact and store in the dark. See CLEAPSS Hazcard HC081.
- Cyclohexane is HIGHLY FLAMMABLE, a skin/respiratory IRRITANT and very TOXIC to aquatic life. See CLEAPSS Hazcard HC045b.
- Cyclohexene is a HIGHLY FLAMMABLE liquid and vapour. It is HARMFUL if ingested or in contact with the skin and is very TOXIC to aquatic life. See CLEAPSS Hazcard HC045c.
- Limonene is FLAMMABLE as liquid and vapour. It is TOXIC to aquatic life and is an IRRITANT and SENSITISER to skin. See CLEAPSS Hazcard HC045c.