

Fuel cells for future energy (preparation details for teachers and technicians)

SAFETY

KOH

H290 May be corrosive to metals

H302 Harmful if swallowed

H314 Causes severe skin burns and eye damage

P280 Wear protective gloves/clothing/eye protection

TO BUY

Potatoes: small potatoes are fine, but any size will work

Pennies: this acts as a copper electrode, either 1p or 2p coins work fine

Galvanised screws: these provide the zinc needed for the redox; nearly all screws and nails sold are galvanised iron; they look blue/silver, as opposed to dark raw iron

Graphite electrodes: graphite electrodes can be purchased, although pencils that are sharpened at both ends with a knife to expose the graphite work well.

LEDs

Voltmeter: (mV-V range)

Insulated wires with crocodile clips

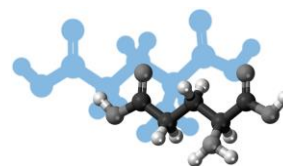
TO PREPARE IN ADVANCE

0.38 M KOH(aq) solution

Each student needs ~ 50 mL solution. To make up 1 L of 0.4 M KOH(aq), dissolve 21 g of KOH (s) in 1 L of deionised water, being careful to add base to water.

Carbon electrodes

If pencils are being used as electrodes, sharpen both ends of each pencil with a knife to expose ~3 mm of 'lead' at each end.



STUDENTS WILL NEED

- 6 small potatoes
- 6 x 2 pence (or 1 pence) pieces
- 6 x galvanised screws/nails
- 7 insulated wires with crocodile clips
- a voltmeter
- an LED
- 2 graphite electrodes (2 pencils work well, sharpened with a knife of both ends to extend the graphite, or 6 x 0.7 mm leads for propelling pencils, taped together per electrode)
- selotape
- blu tack
- 1 x beaker
- 0.4 M KOH (aq)
- 1 x 9 V battery
- plastic knife
- universal indicator paper