

Supplementary Information

Pencil Electrolysis — A Combined Electrode–Battery Assembly

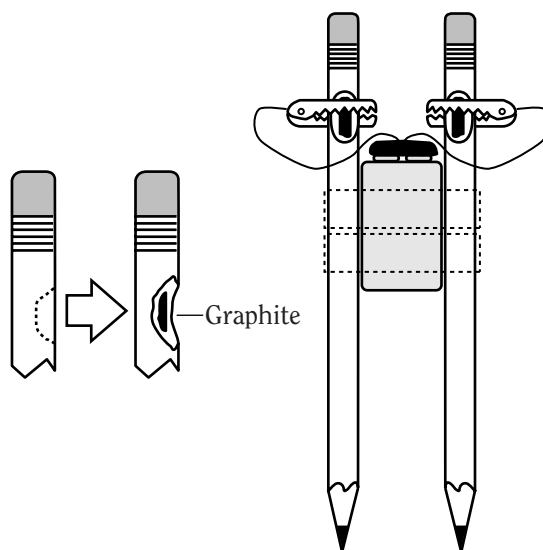
A very simple electrolysis device can be used to demonstrate a variety of electrochemical reactions.

Materials

Two sharpened #2 pencils	Petri dish
Battery, 9-V	Electrician's tape
Battery cap with alligator clip leads	Pocket knife

Construction

1. For each pencil, whittle away one side of the pencil shaft just below the eraser. This may be accomplished with a sharp pocket knife or a wood file. Enough of the shaft must be removed to expose the graphite as shown in the drawing. (Be careful not to break the graphite.)
2. Place the battery cap, with attached alligator clips, on the battery, then position the battery between the two pencils, just below the carved away sections, as shown at right. Wrap tape securely around the assembly. Now attach one clip to each pencil so that it is in good contact with the exposed graphite.



Presentation

Dissolve a few grams of sodium sulfate or other salt in 50 mL of water. Add an acid–base indicator such as bromthymol blue or universal indicator.

Put a Petri dish bottom on the overhead projector, and pour the salt solution into the dish.

Holding the pencil-electrolysis device at an angle, place the two pencil tips in the solution. Observe. Bubbling should be apparent at both electrodes (pencil tips), about twice as vigorous at one tip as at the other. Color changes at each electrode indicate the formation of H^+ and OH^- ions. Ask students to write what reactions are occurring at each electrode.

