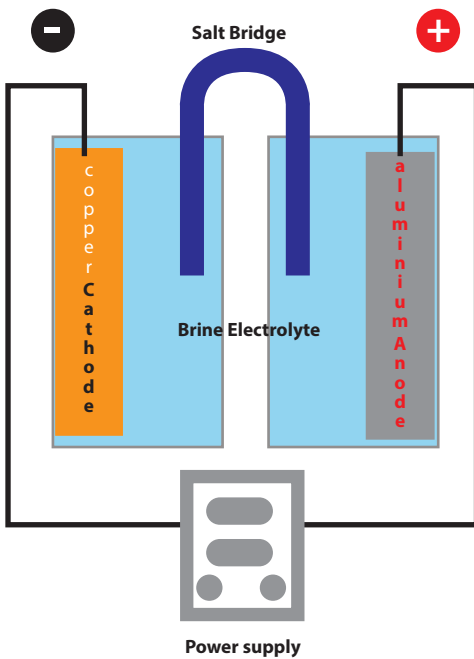


## Salt Bridge Etching Aluminium



Electrolyte brine 150g sodium chloride per Litre of water + 100g of edta per Litre.  
Salt bridge 250g sodium chloride per Litre of water.

### Observation

When the power is switched on there is minimal gas activity on the cathode and anode. The power supply readings show 10v. to achieve 0.12 amps. a resistance of 88.33 ohms. After an hour the aluminium shows a modest etch.

### Conclusions

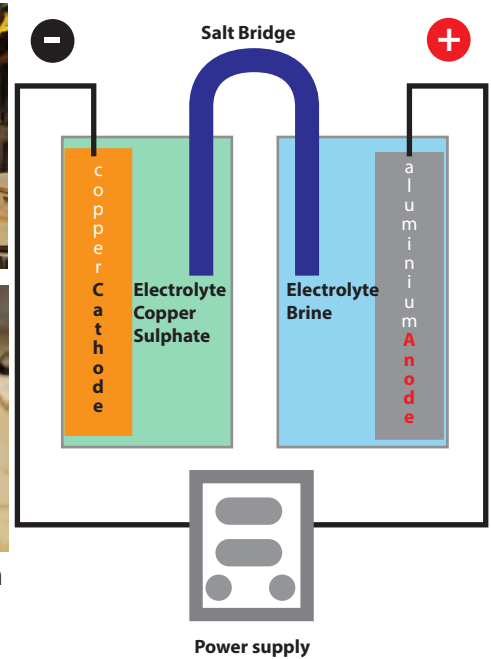
The advantage of the salt bridge is that the solutions do not mix with each other this could potentially help to increase the life of the electrolyte and make disposal issues clearer. Disadvantage is the increased electrical resistances created by the bridge slowing down the etching process.

### Further experiments

Fill bridges with agar brine mix. Look for more conductive material to make bridges.  
Try increasing electrolyte in solution.  
Try different electrolytes i.e. sodium sulphate, aluminium sulphate.



Bridge 1 inch brine filled open ended polythene tubing.

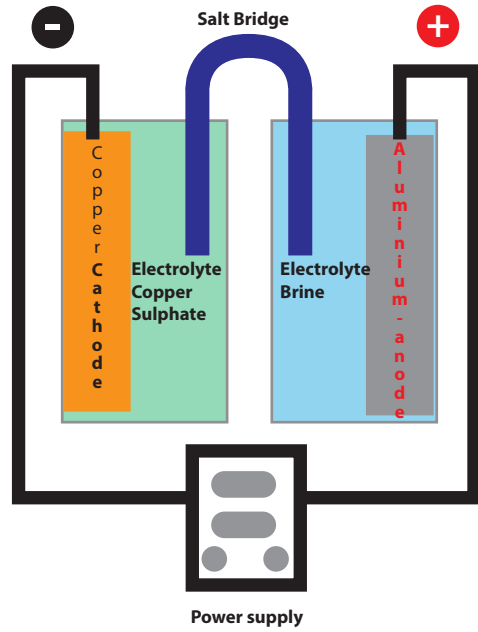


Copper sulphate electrolyte 150g per Litre of water.  
Brine 150g sodium chloride per Litre of water + 100g of edta per Litre.  
Salt bridge 250g sodium chloride per Litre of water.

### Observation

When the power is switched on there is no observable action in the cathode cell and minimal evidence of gas from the anode. The resistance appears to be similar to the brine experiment. The etch is slightly better.

# Salt Bridge Experiment 2



### Test Plate

Copper sulphate electrolyte 150g per Litre of water.  
 Brine 200g sodium chloride per Litre of water + 150g of sodium gluconate per Litre.  
 Salt bridge 250g sodium chloride per Litre of water.

### Observation

When the power is switched on there is no observable action in the cathode cell and minimal evidence of gas from the anode. This plate was etched in the setup above. Four salt bridges were used. If one of the salt bridges is removed there is a noticeable increase in resistance. I will post pictures of prints made in the next couple of days.

### Comment

My working assumption is that the copper cell is more or less self sufficient and sustaining. There will be a build of aluminium by products in the aluminium cell. Etch quality will depend to some degree to the amount of aluminium that is in solution in the electrolyte. Not enough and the etch is raw and course too much and the etch will slow down. The addition of sodium gluconate helps to slow down the production of aluminium hydroxide and increase the life of the electrolyte.

My reading so far is that the products of the aluminium cell, both in scale and type are mostly innocuous and are commonly used as gardening and water purification. It is the products of the copper cell that need more careful handling and disposal.

I am still using sodium chloride for the salt bridges. I'm planning to replace that with potassium chloride and to increase the size of the aluminium cell.

