Tracking Copper After the Current Reverses

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A simulation has two copper electrodes in a solution of copper ions. A copper ion gains two electrons to join an electrode as copper metal. A copper atom loses two electrons when it leaves as Cu^{2+}. The display reverses the current between two steps.

Step	Change in copper on P (mol)	Change in copper on Q (mol)
First	+0.006	−0.006
Second	−0.004	+0.004

1 Which electrode shows copper reduction in the second step?

(1) P only

(2) Q only

(3) Both electrodes

(4) Neither electrode

2 Calculate the net copper change at each electrode across both steps. [1]

Answer and work

3 A student says only 0.002 mol of copper ions gained electrons during the full test. Evaluate the claim using both gains. [1]

Answer and work

The model counts every electron involved in a copper reduction, regardless of the direction of current.

4 Calculate the amount of electrons counted over the two steps. [1]

Answer and work

A final step transfers 0.002 mol copper from P to Q, restoring both electrodes to their starting amounts.

5 Calculate the total amount of copper ions reduced over all three steps. Explain what the restored electrode amounts leave out. [1]

Answer and work