Tracking Copper Under a Silver Deposit

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

A class studies a model in which dissolved silver ions meet a copper strip. Silver atoms collect on the strip while copper atoms enter the solution as Cu^{2+}. The model assumes the deposited silver stays attached and no other solid changes mass.

$Cu(s) + 2Ag^{+}(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s)$

1 Which change in the equation represents oxidation?

(1) Ag^{+} becomes Ag.

(2) Cu becomes Cu^{2+}.

(3) Ag^{+} gains an electron.

(4) Cu^{2+} becomes Cu.

2 Explain why two silver ions are needed for each copper atom that becomes Cu^{2+}. [1]

Answer and work

In one model run, 0.0100 mol of copper leaves a strip that initially weighs 10.00 g. Use molar masses of 63.5 g/mol for Cu and 107.9 g/mol for Ag.

3 Predict the final mass of the strip with its attached silver. Show how both the copper loss and silver gain enter the calculation. [1]

Answer and work

4 A student argues that an increase in the strip’s total mass proves no copper left it. Explain why the result does not establish that claim. [1]

Answer and work