Checking Electrons in a Model Metal Deposit

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

A class models two metal deposition trials. The silver trial reduces Ag^+ to Ag. The zinc trial reduces Zn^{2+} to Zn. An instrument reports that 4.0 mmol of electrons reach the electrode in each trial. The ideal model first assigns all of those electrons to depositing metal.

$Ag^+ + e^- \rightarrow Ag$ $\quad$ $Zn^{2+} + 2e^- \rightarrow Zn$

1 Calculate the ideal amount of silver and of zinc that can deposit in their respective trials. [1]

Answer and work

2 Which statement explains why the ideal amounts differ?

(1) Zinc needs more electrons per ion than silver.

(2) Zinc needs fewer electrons per ion than silver.

(3) Silver does not gain electrons during deposition.

(4) The silver trial delivers more electrons.

The zinc trial actually deposits 1.5 mmol Zn. Assume the electron reading and the zinc measurement are accurate.

3 Calculate how many millimoles of the delivered electrons were used for zinc deposition. [1]

Answer and work

4 A student says all 4.0 mmol of electrons went to the zinc change shown. Evaluate that claim using the measurements. [1]

Answer and work