Tracking Electrons Between Two Ion Reductions

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

A cell simulation sends electrons to a compartment containing Cu^{2+} and Fe^{3+}. Copper ions use two electrons each to form solid Cu. Iron ions use one electron each to form dissolved Fe^{2+}. The supplied electrons are used only by these two routes.

$Cu^{2+} + 2\ e^{-} \rightarrow Cu$

$Fe^{3+} + e^{-} \rightarrow Fe^{2+}$

Trial	Electrons supplied (model units)	Copper atoms deposited (model units)
P	8	3
Q	8	2

1 Which reaction in the display gives a solid product?

(1) Copper reduction only

(2) Iron reduction only

(3) Both reductions

(4) Neither reduction

2 Calculate how many iron ions are reduced in P and in Q. [1]

Answer and work

3 A student says the equal electron inputs prove equal amounts of copper were deposited. Use both records to evaluate the claim. [1]

Answer and work

In a repeat the iron ions are absent and there are enough copper ions to use all eight supplied electrons.

4 Predict the number of copper atoms deposited in the repeat. [1]

Answer and work