Checking Where Dissolved Zinc Came From

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

A reaction simulation uses a sample containing zinc metal and zinc oxide. Both forms give dissolved Zn^{2+}. Only the metal route also produces hydrogen gas. The simulation collects all hydrogen, records all dissolved zinc ions, and runs both routes to completion.

$Zn + 2\ H^+ \rightarrow Zn^{2+} + H_2$

$ZnO + 2\ H^+ \rightarrow Zn^{2+} + H_2O$

Record	**Amount (mol)**
Zn^{2+} in solution	0.050
H_2 collected	0.020

1 Which measurement directly gives the amount of zinc metal that reacted?

(1) The 0.050 mol Zn^{2+} reading

(2) The 0.020 mol H_2 reading

(3) The sum of the two readings

(4) Neither reading can be used

2 Calculate the amounts of zinc metal and zinc oxide originally present. [1]

Answer and work

3 A student says all the dissolved zinc came from oxidation of zinc metal. Select whether the evidence supports or refutes the claim. Use oxidation numbers for the oxide route. [1]

Select one

☐ Supports the claim

☐ Refutes the claim

Answer and work

A second model gives the same dissolved zinc reading, but the hydrogen amount doubles.

4 Predict how much of the second sample’s dissolved zinc came from zinc oxide. [1]

Answer and work

5 Compare how much H^+ the two samples use. Explain whether a measurement of H^+ use could distinguish the two starting mixtures. [1]

Answer and work