

Cell Potential, Spontaneity, and Concentration Trends

g11_u05_w17

Purpose and boundary

Use supplied original fictional cell-data cards only. No cell construction, circuits, materials, or device operation is requested.

Targets: I can use a stated potential model to compare redox direction and concentration trends while naming evidence limits. **Vocabulary:** anode, cathode, reduction, oxidation, cell potential, spontaneous. **Prerequisites:** oxidation numbers, equilibrium direction, units.

1. In a galvanic-cell model, which electrode is oxidation and which is reduction?

2. State the sign convention for $E_{\text{cell}}^{\circ} = E_{\text{cathode}}^{\circ} - E_{\text{anode}}^{\circ}$.

3. A fictional cathode reduction is $+0.80$ V and anode reduction is $+0.34$ V. Find E_{cell}° .

4. Is item 3 positive or negative under the stated model? What direction is favored?

5. Explain why electron flow in the external model runs from anode to cathode.

6. Why does ion movement in an internal model matter for charge balance?

7. If both half-reaction coefficients double, does E_{cell}° double? Explain.

8. A card has $E_{\text{cell}}^{\circ} = -0.20$ V. What does it say about the written direction in the stated standard model?

9. Reverse the written reaction in item 8. What happens to the sign?

10. Distinguish positive potential from a claim about rate or device lifetime.

11. A concentration card shows the reactant ion increasing while products are fixed. Predict one qualitative tendency for the stated reaction quotient model.
-
12. Why must temperature and a stated model be controlled before comparing potentials?
-
13. A card reports .50 V then .47 V under changed concentrations. State one supported claim and one unsupported claim.
-
14. In a notation card, identify anode and cathode from $A|A^+||B^+|B$ when A is oxidized.
-
15. What does the double line represent in a symbolic cell model?
-
16. Why is a salt bridge drawing a model rather than proof of a particular apparatus?
-
17. A data card has positive potential but zero reported current. Name one possible model/data explanation without diagnosing a real device.
-
18. Explain why standard-state potential and measured potential need not match numerically.
-
19. State one uncertainty or measurement limitation for a supplied potential value.
-
20. Write a bounded conclusion from a positive fictional cell-potential card.
-