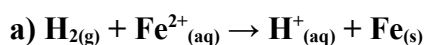
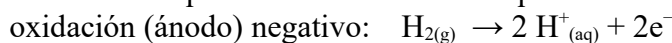


Problema870: Utilizando a táboa de potenciais normais, razoa se as seguintes reaccións serán espontáneas.

- a) $\text{H}_{2(g)} + \text{Fe}^{2+}_{(aq)} \rightarrow \text{H}^{+}_{(aq)} + \text{Fe}_{(s)}$
 b) $\text{Ni}_{(s)} + \text{H}^{+}_{(aq)} \rightarrow \text{Ni}^{2+}_{(aq)} + \text{H}_{2(g)}$
 c) $\text{Zn}_{(s)} + \text{Ni}^{2+}_{(aq)} \rightarrow \text{Zn}^{2+}_{(aq)} + \text{Ni}_{(s)}$
 d) $\text{Al}_{(s)} + \text{Pb}^{2+}_{(aq)} \rightarrow \text{Al}^{3+}_{(aq)} + \text{Pb}_{(s)}$
 e) $\text{Sn}_{(s)} + 2 \text{H}^{+}_{(aq)} \rightarrow \text{Sn}^{2+}_{(aq)} + \text{H}_{2(g)}$
 f) $\text{Cu}_{(s)} + \text{Pb}^{2+}_{(aq)} \rightarrow \text{Cu}^{2+}_{(aq)} + \text{Pb}_{(s)}$
 g) $\text{Al}_{(s)} + \text{Ni}^{2+}_{(aq)} \rightarrow \text{Al}^{3+}_{(aq)} + \text{Ni}_{(s)}$
 h) $\text{Cl}_{2(g)} + 2 \text{F}^{-}_{(aq)} \rightarrow 2 \text{Cl}^{-}_{(aq)} + \text{F}_{2(g)}$



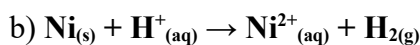
Observamos que substancia se oxida e que substancia se reduce:



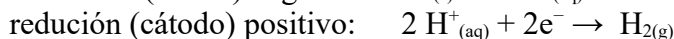
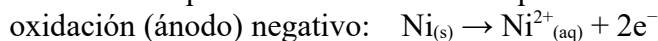
Calculamos o potencial da hipotética pila que funcionase con eses eléctrodos:

$$E^{\circ}_{\text{pila}} = E^{\circ}_{\text{cat}} - E^{\circ}_{\text{án}} = E^{\circ}_{\text{Fe}^{2+}/\text{Fe}} - E^{\circ}_{\text{H}^{+}/\text{H}_2} = -0,44 - (0,00) = -0,44\text{V}$$

Se o $E^{\circ}_{\text{pila}} < 0$, dado que $\Delta G^{\circ} = -n \cdot F \cdot E^{\circ}_{\text{pila}}$, obtense que $\Delta G^{\circ} > 0$, polo que a reacción non será espontánea.



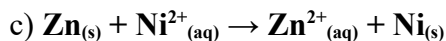
Observamos que substancia se oxida e que substancia se reduce:



Calculamos o potencial da hipotética pila que funcionase con eses eléctrodos:

$$E^{\circ}_{\text{pila}} = E^{\circ}_{\text{cat}} - E^{\circ}_{\text{án}} = E^{\circ}_{\text{H}^{+}/\text{H}_2} - E^{\circ}_{\text{Ni}^{2+}/\text{Ni}} = 0,00 - (-0,25) = +0,25\text{V}$$

Se o $E^{\circ}_{\text{pila}} > 0$, dado que $\Delta G^{\circ} = -n \cdot F \cdot E^{\circ}_{\text{pila}}$, obtense que $\Delta G^{\circ} < 0$, polo que a reacción si será espontánea.



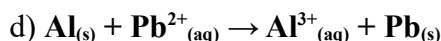
Observamos que substancia se oxida e que substancia se reduce:



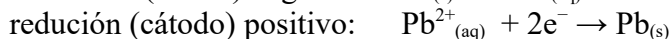
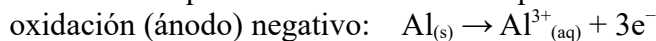
Calculamos o potencial da hipotética pila que funcionase con eses eléctrodos:

$$E^{\circ}_{\text{pila}} = E^{\circ}_{\text{cat}} - E^{\circ}_{\text{án}} = E^{\circ}_{\text{Ni}^{2+}/\text{Ni}} - E^{\circ}_{\text{Zn}^{2+}/\text{Zn}} = -0,25 - (-0,76) = +0,51\text{V}$$

Se o $E^{\circ}_{\text{pila}} > 0$, dado que $\Delta G^{\circ} = -n \cdot F \cdot E^{\circ}_{\text{pila}}$, obtense que $\Delta G^{\circ} < 0$, polo que a reacción si será espontánea.



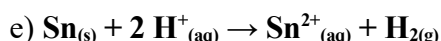
Observamos que substancia se oxida e que substancia se reduce:



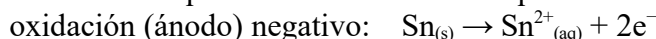
Calculamos o potencial da hipotética pila que funcionase con eses eléctrodos:

$$E^{\circ}_{\text{pila}} = E^{\circ}_{\text{cat}} - E^{\circ}_{\text{án}} = E^{\circ}_{\text{Pb}^{2+}/\text{Pb}} - E^{\circ}_{\text{Al}^{3+}/\text{Al}} = -0,13 - (-1,66) = +1,53\text{V}$$

Se o $E^{\circ}_{\text{pila}} > 0$, dado que $\Delta G^{\circ} = -n \cdot F \cdot E^{\circ}_{\text{pila}}$, obtense que $\Delta G^{\circ} < 0$, **polo que a reacción si será espontánea.**



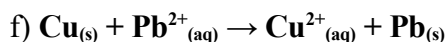
Observamos que substancia se oxida e que substancia se reduce:



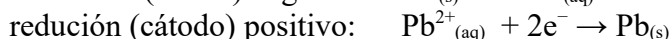
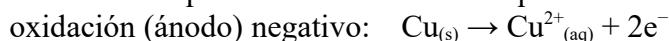
Calculamos o potencial da hipotética pila que funcionase con eses eléctrodos:

$$E^{\circ}_{\text{pila}} = E^{\circ}_{\text{cat}} - E^{\circ}_{\text{án}} = E^{\circ}_{\text{H}^{+}/\text{H}_2} - E^{\circ}_{\text{Sn}^{2+}/\text{Sn}} = 0,00 - (-0,14) = +0,14\text{V}$$

Se o $E^{\circ}_{\text{pila}} > 0$, dado que $\Delta G^{\circ} = -n \cdot F \cdot E^{\circ}_{\text{pila}}$, obtense que $\Delta G^{\circ} < 0$, **polo que a reacción si será espontánea.**



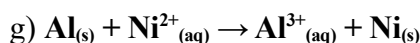
Observamos que substancia se oxida e que substancia se reduce:



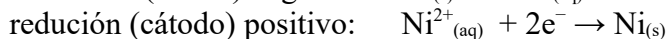
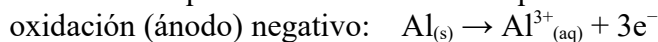
Calculamos o potencial da hipotética pila que funcionase con eses eléctrodos:

$$E^{\circ}_{\text{pila}} = E^{\circ}_{\text{cat}} - E^{\circ}_{\text{án}} = E^{\circ}_{\text{Pb}^{2+}/\text{Pb}} - E^{\circ}_{\text{Cu}^{2+}/\text{Cu}} = -0,13 - (+0,34) = -0,47\text{V}$$

Se o $E^{\circ}_{\text{pila}} < 0$, dado que $\Delta G^{\circ} = -n \cdot F \cdot E^{\circ}_{\text{pila}}$, obtense que $\Delta G^{\circ} > 0$, **polo que a reacción non será espontánea.**



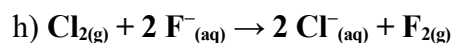
Observamos que substancia se oxida e que substancia se reduce:



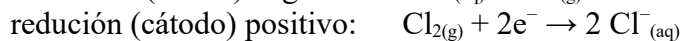
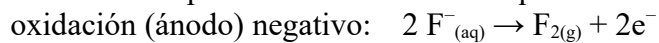
Calculamos o potencial da hipotética pila que funcionase con eses eléctrodos:

$$E^{\circ}_{\text{pila}} = E^{\circ}_{\text{cat}} - E^{\circ}_{\text{án}} = E^{\circ}_{\text{Ni}^{2+}/\text{Ni}} - E^{\circ}_{\text{Al}^{3+}/\text{Al}} = -0,25 - (-1,66) = +1,41\text{V}$$

Se o $E^{\circ}_{\text{pila}} > 0$, dado que $\Delta G^{\circ} = -n \cdot F \cdot E^{\circ}_{\text{pila}}$, obtense que $\Delta G^{\circ} < 0$, **polo que a reacción si será espontánea.**



Observamos que substancia se oxida e que substancia se reduce:



Calculamos o potencial da hipotética pila que funcionase con eses eléctrodos:

$$E^{\circ}_{\text{pila}} = E^{\circ}_{\text{cat}} - E^{\circ}_{\text{án}} = E^{\circ}_{\text{Cl}_2/\text{Cl}^-} - E^{\circ}_{\text{F}_2/\text{F}^-} = +1,36 - (+2,87) = -1,51 \text{ V}$$

Se o $E^{\circ}_{\text{pila}} < 0$, dado que $\Delta G^{\circ} = -n \cdot F \cdot E^{\circ}_{\text{pila}}$, obtense que $\Delta G^{\circ} > 0$, **polo que a reacción non será espontánea.**