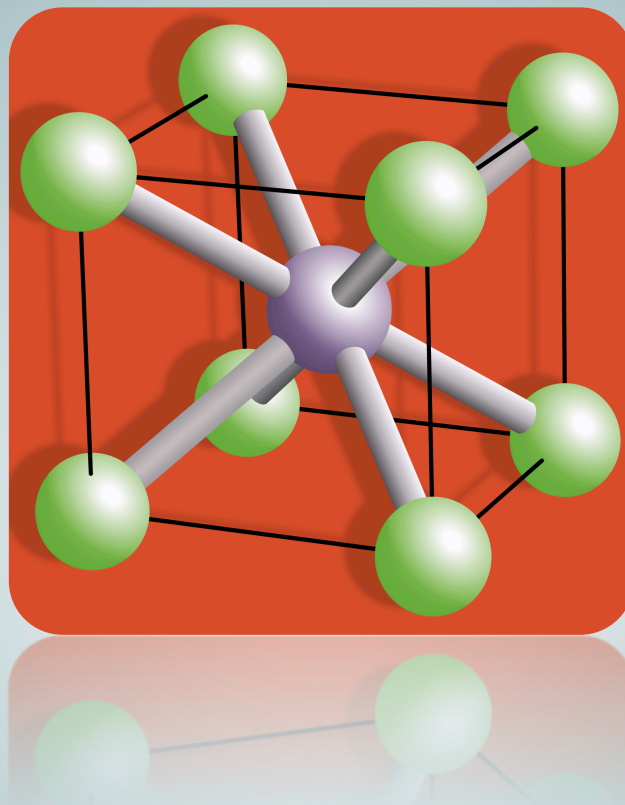


Materials

Exercises Topic 9. Corrosion



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CORROSION

1. In a lab demonstration that employed an electrolytic cell with iron electrodes, an electrical intensity of current of 10 mA is measured.

a) Estimate how many times per second the oxidation semi-reaction takes place.

If one of the Fe ($E_0 = -0,440$ V) electrodes is substituted by a Zn ($E_0 = -0,763$ V) electrode:

b) Decide which one of the electrodes will be corroded.

c) If both electrodes are immersed in 1M solutions of their respective ions, calculate the voltage measured between them.

2. Consider a galvanic cell consisting of a Magnesium electrode ($E_0 = -2,363$ V) in a 1M solution of $MgSO_4$ and an iron ($E_0 = -0,440$ V) electrode 1M of $FeSO_4$. Each electrode and its corresponding electrolyte are separated by a porous membrane and the whole cell is at 25°C. Both electrodes are externally connected by a copper wire.

a) What electrode is the anode?

b) What electrode corrodes?

c) In what direction are flowing the electrons?

d) In what direction are moving the cations through the electrolyte?

e) What is the semi-reaction verified by the anode?

f) If the regular potentials of the electrode are referred to the oxidation semi-reactions. What will be the electromotive force (voltage) of the battery?