

17.9: Electrochemistry and Conductivity

From the considerations we have discussed, it is evident that any electrolytic cell involves a flow of electrons in an external circuit and a flow of ions within the materials comprising the cell. The function of the current collectors is to transfer electrons back and forth between the external circuit and the cell reagents.

The measurement of [solution conductivity](#) is a useful technique for determining the concentrations and mobilities of ions in solution. Since conductivity measurements involve the passage of electrical current through a liquid medium, the process must involve electrode reactions as well as motion of ions through the liquid. Normally, the electrode reactions are of little concern in conductivity measurements. The applied potential is made large enough to ensure that some electrode reaction occurs. When the liquid medium is water, the electrode reactions are usually the reduction of water at the cathode and its oxidation at the anode. The conductivity attributable to a given ionic species is approximately proportional to its concentration. In the absence of dissolved ions, little current is passed. For aqueous solutions, this just restates the familiar observation that pure water is a poor electrical conductor. When few ions are present, it is not possible to move charge through the cell quickly enough to support a significant current in the external circuit.

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