Electrolysis of Water in an Acid-Base System

Richard Michaud Langis, Mount Allison University
Supervisor(s): Bruning, Ralf

An electrolysis cell was constructed to explore an improved method of producing hydrogen in an acid-base diode system. Two compartments, holding an acid and a base, are separated by a reverse osmosis membrane. The membrane prevents the acid and base ions from mixing, while allowing H+ and OH– to diffuse through it. High concentrations of H+ at the cathode and of OH– at the anode allow, at least in principle, to carry out the electrolysis at a lower applied potential than in a uniform electrolyte. With H2SO4 and Ca(OH)2, the current was measured as a function of voltage applied to the electrodes. Cell performance was monitored with additional Ag/AgCl electrodes. Results of these experiments, as well as tests with a polymeric acid and base will be discussed. Future experiments with photoacids are envisaged to replenish H+ ions with the aid of sunlight.