

size of 10 to 20 Å with a capacity of 2 to 3 mEq/g dw resin. Membrane thickness is on the order of 0.1 to 0.6 mm, and electrical resistance is approximately 3 to 30 ohm/cm².

ED units can be used for (1) concentration and dilution of salts, (2) ion substitution, and (3) electrolysis. A schematic of an ED unit used for concentration and dilution of salts is depicted in Fig. 11.32. The unit contains a number of diluting (D^*) and concentrating (C^*) compartments separated by alternating anion–cation membranes and two electrodes, the cathode and anode. ED units can also be used for ion-substitution purposes to change the ionic composition of a process stream. If the ionic liquid stream is passed between two membranes of the same charge (two cation or two anion exchange membranes), ions will be transferred from the solution in one direction through one membrane, and equivalent ions of the same charge will be transferred into the solution through the opposite membrane from a makeup solution on the other side of the membrane. In electrolytic ED units, electrodes play an important fundamental role in the process. Two electrode compartments are separated by

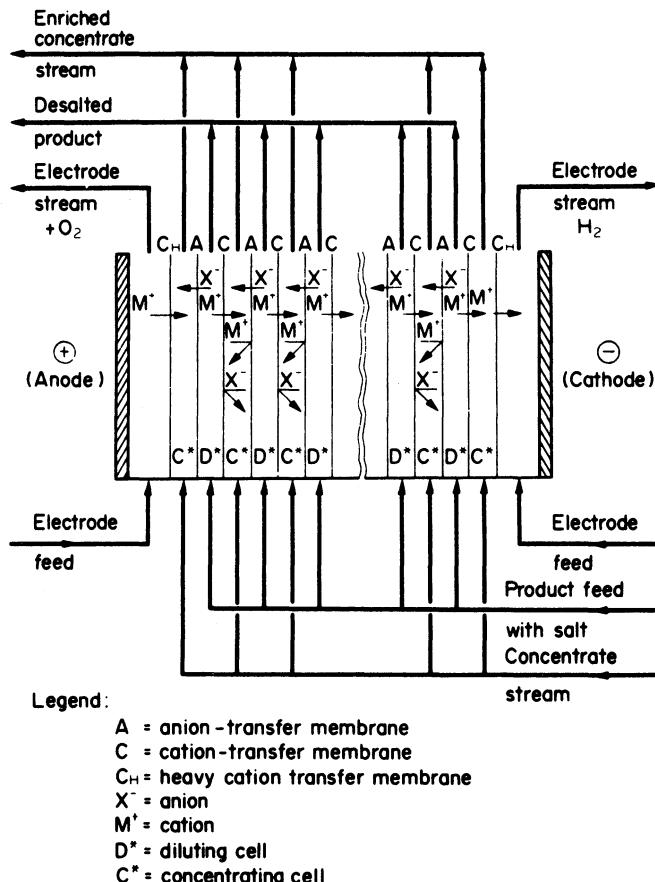


Figure 11.32. Schematic illustration of concentrating-diluting multicell pair electro-dialysis process. (With permission, from S. M. Jain and P. B. Reed, in M. Moo-Young, ed., *Comprehensive Biotechnology*, Vol. 2, Elsevier Science, London, 1985.)