

Answer on Question #78304 - Chemistry - Physical Chemistry

Question:

A Hittorf cell filtered with Ag/AgCl electrode is filled with HCl solution that contains 0.3856×10^{-3} g HCl/g water. A current of 2.00 A is passed for exactly 3 hours. The solution is withdrawn, weighed, and analysed. The total weight of a cathode solution is 51.7436 g, it contains 0.0267 g of HCl. The anode solution weighs 52.0461 g and contains 0.0133 g of HCl. What is the transference number of the H⁺ ion?

Solution:

$$m = ItM/Fz;$$

$$m = 2 \times 180 \times 36.5 / 96500 = 0.13617 \text{ g};$$

$$t_+ = \Delta c_k / (\Delta c_k + \Delta c_a);$$

$$t(\text{H}^+) = 5 t(\text{Cl}^-);$$

$$t_+ = 5/6 = 0.83.$$

Answer: 0.83.

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