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9.11 Electrolysis and Faraday's Law

AP Chemistry

Show your work with units. Use q = It, 1 A = 1 C/s, and F = 96,485 C/mol e^-. Time must be in seconds.

1. A current of 3.00 A runs through a Ni^{2+} solution for 45.0 min. What mass of Ni (58.69 g/mol) is deposited?

2. How many minutes does it take to deposit 1.50 g of Zn (65.38 g/mol) from $Zn^{2+}(aq)$ with a current of 4.00 A?

3. A part is chrome-plated from a Cr^{3+} solution. What current is needed to deposit 0.750 g of Cr (52.00 g/mol) in 20.0 min?

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4. Two electrolytic cells are connected in series, so the same charge passes through both. One holds $AgNO_3(aq)$ and the other holds $CuSO_4(aq)$. When 1.08 g of Ag (107.87 g/mol) deposits in the first cell, what mass of Cu (63.55 g/mol) deposits in the second?

5. Molten NaCl is electrolyzed with a current of 10.0 A for 1.00 h.

(a) Write the half-reactions at the anode and cathode. (b) What mass of $Cl_2(g)$ (70.90 g/mol) forms? (c) Why is a power source needed?

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