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Electrochemical Methods for the Micro- and Nanoscale

www.electrochemical-methods.org

Solutions to the tasks: Chapter 9 – Microfabrication, nanotechnology

Task 9.1 (Electrodeposition of metals)

In this task, we compare the plating of different metals. Nickel and copper deposit in a two-electron, silver in an one-electron process. Faraday's law provides the deposited mass per area based on the molar masses (M), current density i , and deposition time t . Dividing by the metal's density (ρ) converts to the desired height h of the metal layers:

$$h = \frac{M \cdot i \cdot t}{n \cdot F \cdot \rho}$$

For the given deposition parameters, the deposit's height is 2.1 μm for Nickel, 6.4 μm for silver and 2.2 μm for copper.