3.091 Solid State Chemistry: Week 12

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Progress Update

Over the past week I have:

1. Worked on Exam 2.

Example Problem (Statement): Resistance of Tungsten

Problem: A current of 8.714 milliamps (10^{-3} A) is measured flowing through a tungsten wire of diameter 0.2 mm and 8 cm long when 1.4 mV is applied. What is the resistivity of tungsten? Express your answer in ohm-m.

Example Problem (Solution): Resistance of Tungsten

Recall the definition of resistivity:

$$p = R \cdot A \cdot l^{-1}$$

See by Ohm's law that

$$R = \frac{V}{I};$$

thus from the given information,

$$\begin{aligned} p &= \frac{1.4 \cdot 10^{-3}}{8.714 \cdot 10^{-3}} \cdot \frac{(1/2(0.2 \cdot 10^{-}3))^2 \cdot \pi}{8 \cdot 10^{-}2} \\ &= 6.309 \cdot 10^{-8}\,\Omega\mathrm{m}^{-1} \end{aligned}$$