



**MATERIALS SCIENCE
& ENGINEERING**
TEXAS A&M UNIVERSITY

Introduction to Materials Science & Engineering

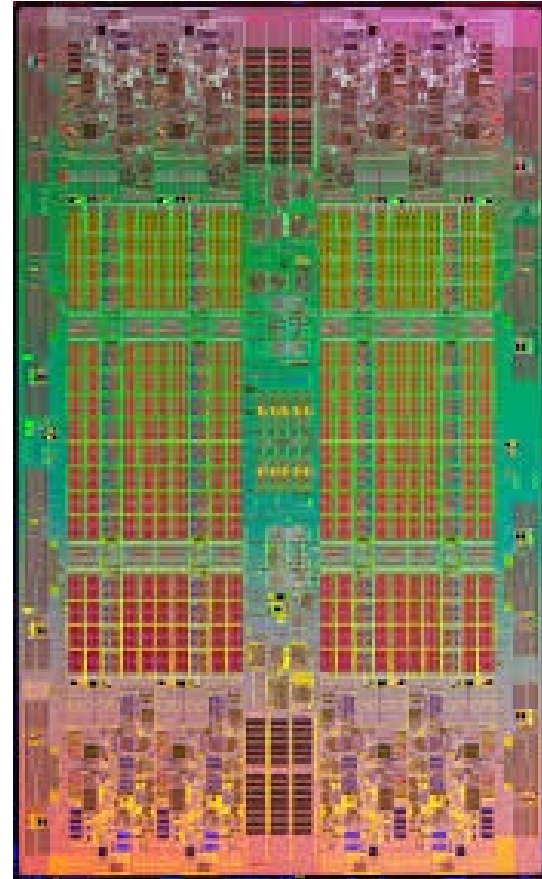
Resistivity vs Temperature: Metals vs Semiconductors

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Resistivity vs. Temperature: Metals vs. Semiconductors



Conductivity/Resistivity vs. Temperature

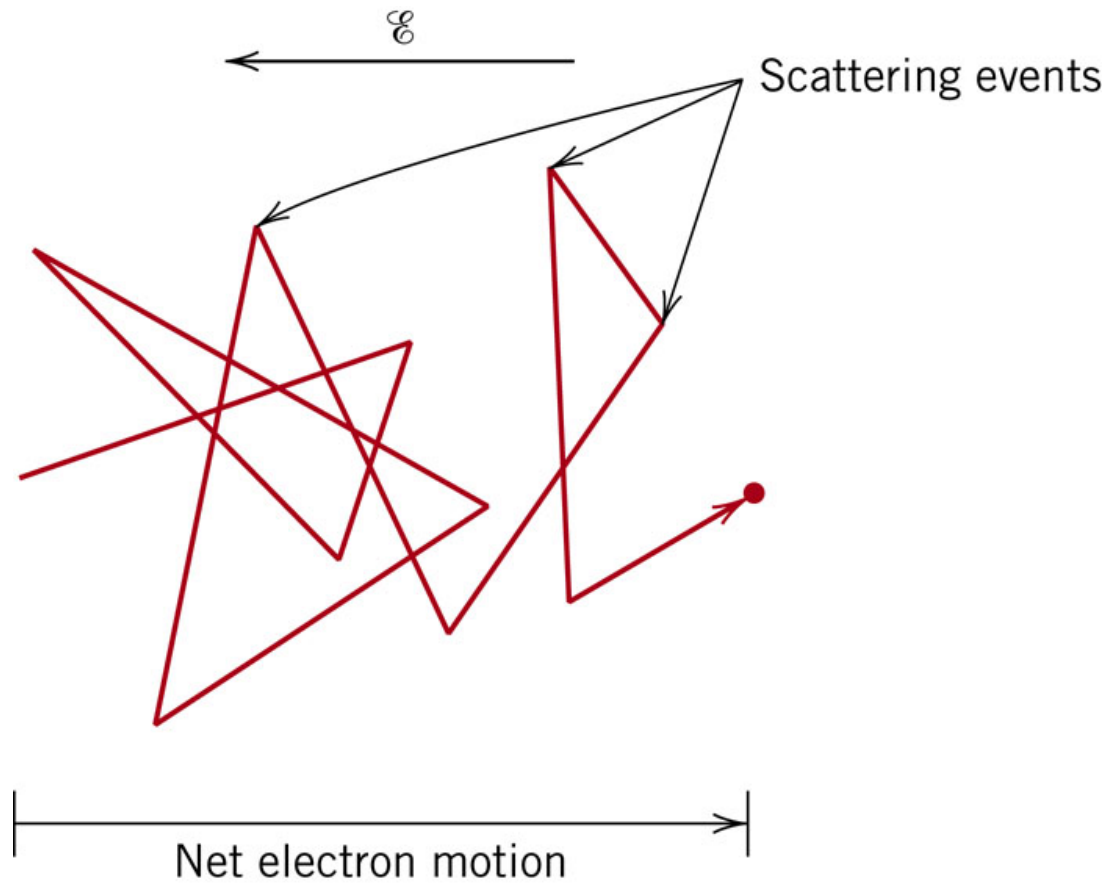
$$\sigma = n|e|\mu$$

Temperature: Carrier concentration

$$\sigma = n|e|\mu$$

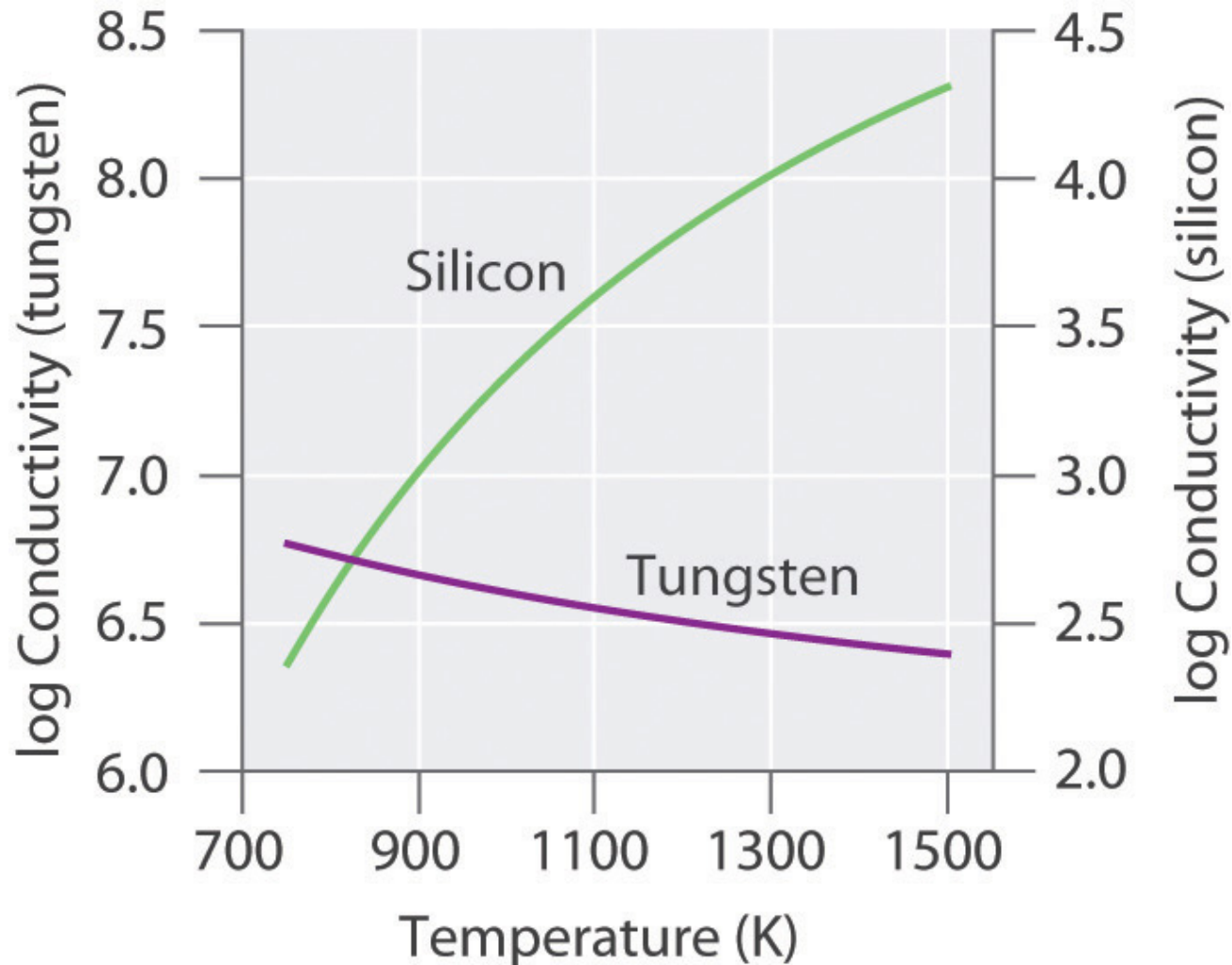
Temperature: Mobility

$$\sigma = n|e|\mu$$



Metals vs. Semiconductors

$$\sigma = n|e|\mu$$



Summary

1. Resistivity **INCREASES** in metals w/
increasing temperature
2. Resistivity **DECREASES** in semiconductors
w/ increasing temperature
3. Consider: $\sigma = n|e|\mu$