Problem Set 1 E-344

Due: Thursday, 29 January, 2004 Spring 2004

at beginning of lecture

1. Identify the five major classes of engineering materials. For each of the five, list two applications from your own common experience where such a material is used. Choose two of the ten applications examples you cite and develop a list of properties that make that material well suited for the application.

For example, the glass in a light bulb is a ceramic. It is well suited to the task, because it is transparent (optical property), it is an electrical insulator (electrical property), it can withstand elevated temperatures without deforming significantly, and it is strong in compression (most light bulbs are evacuated or have a reduced pressure inside.

2. The density of tungsten (W) wire is 19.3 g/cm^3. Its atomic weight is 183.85 g/mole. Estimate how many W atoms are contained in a piece of tungsten wire which has a diameter of 1mm and a length of 1cm.

3. Write the electron configurations (spdf notation) characterizing flourine (F) and lithium (Li). Use these to rationalize the electronegativity of each.

4. problem 2-10 in Ohring

5. problem 2-18 in Ohring

6. problem 2-26 in Ohring