HW1

Due 1/14/08 Monday

1-7
Coiled springs ought to be very strong and stiff. Si_3N_4 is a strong, stiff material. Would you select this material for spring? Explain.

1-14
Aluminum has a density of 2.7g/cm^3. Suppose you would like to produce a composite material based on aluminum having a density of 1.5g/cm^3. Design a material that would have this density. Would introducing beads of polyethylene, with a density of 0.95g/cm^3, into the aluminum be a likely possibility? Explain.

2-7
(a) Using data in Appendix A, calculate the number of iron atoms in one ton (2000 pounds).
(b) Using data in Appendix A, calculate the volume in cubic centimeters occupied by one mole of boron.

2-29
You wish to introduce ceramic fibers into a metal matrix to produce a composite material, which is subjected to high forces and large temperature changes. What design parameters might you consider to ensure that the fibers will remain intact and provide strength to the matrix? What problems might occur?