Name _____ Date _____ Period _____

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2.4 Structure of Metals and Alloys

AP Chemistry

Explain each answer at the particle level. Use Coulomb's law and the sea of electrons model.

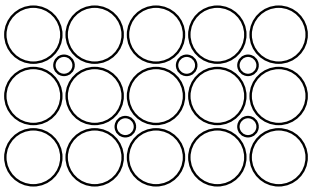
1. Lithium melts at 181 °C and potassium melts at 64 °C.

(a) Explain this difference using metallic bonding.

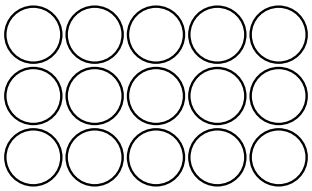
(b) Predict which metal has the higher melting point, sodium or aluminum. Justify your prediction.

2. Identify each diagram as a pure metal, an interstitial alloy, or a substitutional alloy. Justify one of your choices.

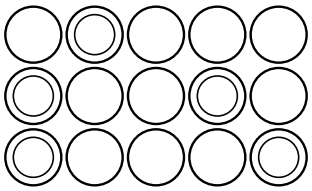
A



B



C



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3. Use the atomic radii to classify each alloy as interstitial or substitutional.

Atom	Fe	N	Cu	Sn	Au	Ag
Radius (pm)	126	75	128	140	144	144

(a) nitrogen in iron (b) bronze, tin in copper (c) gold mixed with silver

4. Steel is iron with a small amount of carbon added. Compared with pure iron, is steel more or less (a) malleable, (b) dense, and (c) hard? Explain using the structure of the alloy.

5. Solid aluminum conducts electricity. Solid Al_2O_3 does not, but molten Al_2O_3 does. Explain all three observations.

6. Gold can be hammered into sheets thinner than paper, but a crystal of NaCl shatters when hit with a hammer. Explain the difference at the particle level.

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