

CHAPTER 3 BLM ANSWER KEY

BLM 3-3: Design an Investigation

Predictions

- The non-polar material should not dissolve in water or show conductivity.
- The polar substance dissolves in water but does not show conductivity.
- The ionic substance dissolves in water and shows conductivity.

Materials

- Students will need distilled water, stirring rods, beakers, and a conductivity tester.
- Samples: choose from the following (or use all if available): sulfur, paraffin wax, or stearic acid for non-polar substances; sucrose, glucose, or urea for polar substances; sodium chloride, sodium bromide, potassium iodide for ionic substances.

Procedure

Students should add each of the substances to some water in a beaker, stir for a while, and observe the solubility of the substances. Then, they should test for the conductivity of each mixed solution.

Observations

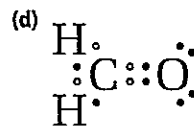
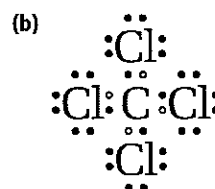
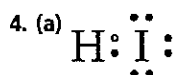
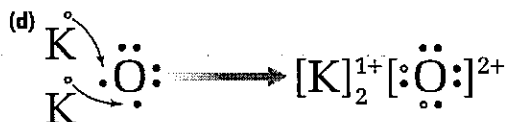
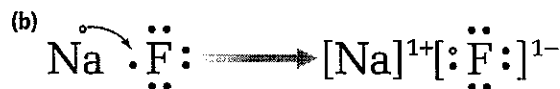
Observations should match predictions above.

BLM 3-5: Chapter 3 Test

Answers

- (a) ionic (b) covalent (c) covalent
- (a) $\Delta EN = EN O - EN K = 3.44 - 0.82 = 2.62$; ionic
 (b) $\Delta EN = EN I - EN C = 2.66 - 2.55 = 0.11$; covalent
 (c) $\Delta EN = EN I - EN Ag = 2.66 - 1.93 = 0.73$; covalent
 (d) $\Delta EN = EN F - EN Al = 3.98 - 1.61 = 2.37$; ionic

*Intermolecular
molecules
bonds*



- (a) $\Delta EN = EN F - EN I = 3.98 - 2.66 = 1.32$; polar covalent
 (b) $\Delta EN = EN Cl - EN Br = 3.16 - 2.96 = 0.20$; non-polar covalent
 (c) $\Delta EN = EN F - EN Li = 3.98 - 0.98 = 3.00$; ionic
 (d) $\Delta EN = EN N - EN C = 3.04 - 2.55 = 0.49$; non-polar covalent
 (e) $\Delta EN = EN O - EN B = 3.44 - 2.04 = 1.40$; polar covalent

- Water is a polar molecule, so it can attract other water molecules strongly, increasing its boiling point. Methane is non-polar, so its molecules are not strongly attracted to one another.

(weaker (London - dispersion forces)).

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7.

	F	O	N	C
Na	NaF sodium fluoride	Na ₂ O sodium oxide	Na ₃ N sodium nitride	Na ₄ C sodium carbide
Mg	MgF ₂ magnesium fluoride	MgO magnesium oxide	Mg ₃ N ₂ magnesium nitride	Mg ₂ C magnesium carbide
Al	AlF ₃ aluminum fluoride	Al ₂ O ₃ aluminum oxide	AlN aluminum nitride	Al ₄ C ₃ aluminum carbide
Si	SiF ₄ silicon tetrafluoride	SiO ₂ silicon dioxide	Si ₃ N ₄ silicon nitride	SiC silicon carbide

8. (a) Na₂SO₄

(b) AlPO₄

(c) CuCl₂

(d) Sn(OH)₄

(e) Fe₂(CO₃)₃

9. (a) potassium permanganate

(b) calcium acetate

(c) lead(IV) oxide

(d) tin(II) sulfite

(e) magnesium hydrogen carbonate

10. FeSO₄, iron(II) sulfate, ferrous sulfate

Fe₂(SO₄)₃, iron(III) sulfate, ferric sulfate