

## CHAPTER 9 BLM ANSWER KEY

### BLM 9-1: Atomic and Ionic Radii

- smaller; tightly; nucleus
- valence; same; repulsive; larger
- Cl will be smaller as atomic radii decrease across the periods
  - $\text{Na}^+$  is smaller because it has lost one full electron shell
  - $\text{Al}^{3+}$  will be smaller as there are more protons in its nucleus attracting a smaller number of electrons
  - $\text{F}^-$  will be smaller as it has fewer electron shells
  - $\text{Li}^+$  will be smaller as it has one less shell
  - $\text{Ti}^{4+}$  will be smaller, as it has more protons but the same number of electrons as  $\text{P}^{3-}$
  - $\text{I}^-$  will be smaller having a stronger nuclear charge
  - $\text{Sn}^{4+}$  will be larger as it has many more electrons and an extra two shells
  - $\text{Fe}^{3+}$  will be smaller having fewer electrons attracted to a positive nucleus having the same charge as  $\text{Fe}^{2+}$
  - $\text{H}^+$  will be smaller having lost an electron whereas  $\text{H}^-$  has gained an electron.

### BLM 9-2: Polyatomic Ions

- chromium(II) sulfate
  - aluminum nitrate
  - ammonium phosphate
  - silver iodate
  - mercury(I) chlorate
  - zinc carbonate
  - nickel(III) nitrate
  - barium bromate
  - beryllium carbonate
- |                                  |                                |
|----------------------------------|--------------------------------|
| (a) $\text{Fe}(\text{ClO}_3)_3$  | (b) $\text{HgIO}_3$            |
| (c) $\text{Al}_2(\text{SO}_4)_3$ | (d) $\text{PbCO}_3$            |
| (e) $(\text{NH}_4)_3\text{PO}_4$ | (f) $\text{Ca}(\text{NO}_3)_2$ |
| (g) $\text{KMnO}_4$              | (h) $\text{AgFO}_3$            |
| (i) $\text{SrSO}_4$              | (j) $\text{Na}_2\text{CrO}_4$  |

### BLM 9-3: Observation Charts for Investigation 9-A

Expected answers are in the Teacher's Resource in the section dealing with this investigation.

### BLM 9-4: Precipitation Reaction Predictions

#### Set A

	$\text{Ba}(\text{NO}_3)_2$	$\text{BaCl}_2$	$\text{Na}_2\text{CrO}_4$	$\text{NaNO}_3$	$\text{K}_2\text{CrO}_4$	KCl
$\text{Ba}(\text{NO}_3)_2$	N					
$\text{BaCl}_2$	N	N				
$\text{Na}_2\text{CrO}_4$	Y	Y	N			
$\text{NaNO}_3$	N	N	N	N		
$\text{K}_2\text{CrO}_4$	Y	Y	N	N	N	
KCl	N	N	N	N	N	N

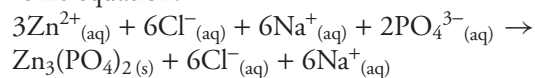
#### Set B

	$\text{Na}_2\text{SO}_4$	$\text{MgCl}_2$	$\text{Al}_2(\text{SO}_4)_3$	$\text{Ba}(\text{NO}_3)_2$	$\text{Sr}(\text{NO}_3)_2$	$\text{AlCl}_3$
$\text{Na}_2\text{SO}_4$	N					
$\text{MgCl}_2$	N	N				
$\text{Al}_2(\text{SO}_4)_3$	N	N	N			
$\text{Ba}(\text{NO}_3)_2$	Y	N	Y	N		
$\text{Sr}(\text{NO}_3)_2$	Y	N	Y	N	N	
$\text{AlCl}_3$	N	N	N	N	N	N

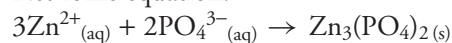
## CHAPTER 9 BLM ANSWER KEY

### BLM 9-5: Writing Ionic and Net-ionic Equations

1. Ionic equation:

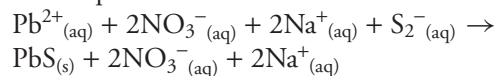


Net-ionic equation:



Spectator ions:  $6\text{Cl}^{-}_{(\text{aq})} + 6\text{Na}^{+}_{(\text{aq})}$

2. Ionic equation:



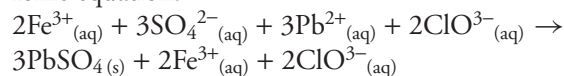
Net-ionic equation:  $\text{Pb}^{2+}_{(\text{aq})} + \text{S}_2^{-}_{(\text{aq})} \rightarrow \text{PbS}(\text{s})$

Spectator ions:  $2\text{NO}_3^{-}_{(\text{aq})} + 2\text{Na}^{+}_{(\text{aq})}$

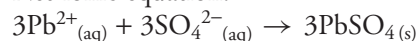
3. Ionic equation: No reaction – all substances are soluble

4. Ionic equation: No reaction – all substances are soluble

5. Ionic equation:



Net-ionic equation:



Spectator ions:  $2\text{Fe}^{3+}_{(\text{aq})} + 2\text{ClO}_3^{-}_{(\text{aq})}$

### BLM 9-6: Solution Terminology

- |                   |                         |
|-------------------|-------------------------|
| 1. conductor      | 2. ionic equation       |
| 3. spectator ions | 4. salt                 |
| 5. metallic       | 6. net-ionic equation   |
| 7. soluble        | 8. stronger             |
| 9. less soluble   | 10. precipitate         |
| 11. insoluble     | 12. double displacement |

### BLM 9-7: Solution Terminology Matchup

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. E  | 2. B  | 3. A  | 4. C  | 5. D  |
| 6. N  | 7. J  | 8. F  | 9. K  | 10. M |
| 11. O | 12. L | 13. I | 14. G | 15. H |

### BLM 9-8: Chapter 9 Test

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. C  | 2. B  | 3. C  | 4. B  | 5. B  |
| 6. A  | 7. A  | 8. A  | 9. B  | 10. B |
| 11. B | 12. A | 13. C | 14. C | 15. C |
| 16. B | 17. C | 18. A | 19. D | 20. D |
| 21. A | 22. B | 23. C | 24. B | 25. C |
| 26. D | 27. D | 28. A | 29. D | 30. C |