

Unit 1, Lesson 05: Answers to Homework on Introduction to Bonding and Ionic Bonding

Page 165, Question 1

- a) $\text{Li}^{1+} \quad 1s^2$
 b) $\text{Ca}^{2+} \quad 1s^2 2s^2 2p^6 3s^2 3p^6$
 c) $\text{Br}^{1-} \quad 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6$
 d) $\text{O}^{2-} \quad 1s^2 2s^2 2p^6$

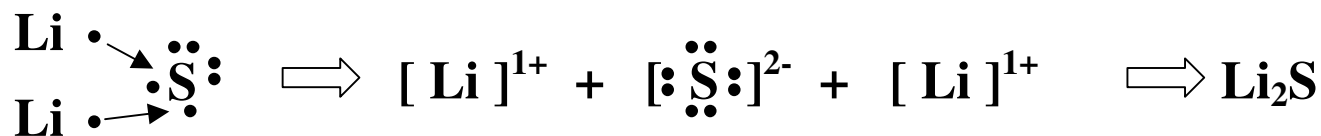
Page 165, Question 2

As a rule, for metal ions, you do not draw in any valence electrons because they have been lost. For non-metals, you draw all eight valence electrons, inside square brackets, to show the electrons that have been gained. You may be asked to follow other conventions in other courses.

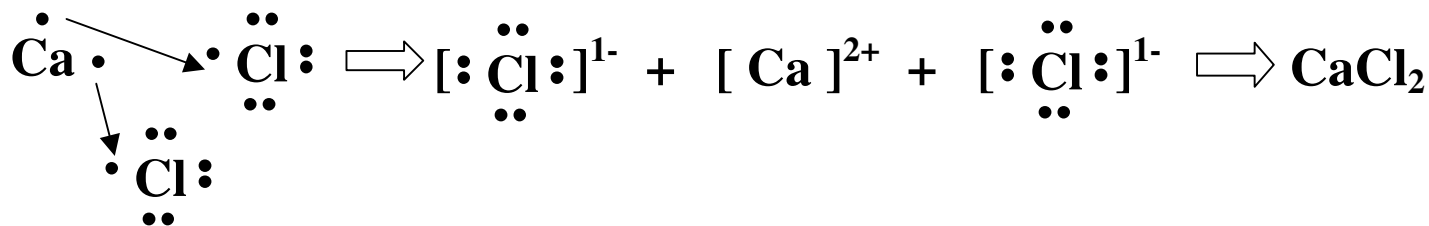
| | | | |
|--|--|---|---|
| a) Li^{1+} $\left[\text{Li} \right]^{1+}$ | b) Ca^{2+} $\left[\text{Ca} \right]^{2+}$ | c) Br^{1-} $\left[\begin{array}{c} \cdot\cdot \\ \cdot\text{Br}\cdot \\ \cdot\cdot \end{array} \right]^{1-}$ | d) O^{2-} $\left[\begin{array}{c} \cdot\cdot \\ \cdot\text{O}\cdot \\ \cdot\cdot \end{array} \right]^{2-}$ |
|--|--|---|---|

Page 165, Question 3

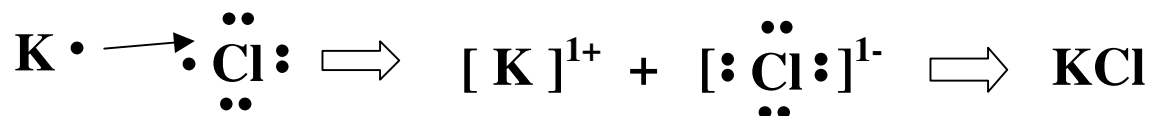
a) bonding between Li and S:



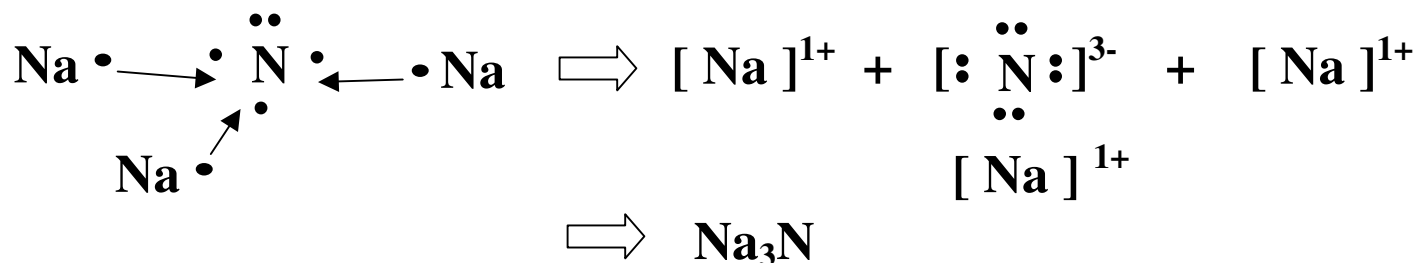
a) bonding between Ca and Cl:



b) bonding between K and Cl:



c) bonding between Na and N:



3. Write ionization reactions (as shown in our notes, without electron configurations) to show the formation of the following ions. What Noble gas is each ion isoelectronic with?

d) Mg^{2+} b) O^{2-} c) Sc^{3+} d) Si^{4+} e) Si^{4-}

a) Mg^{2+} $\text{Mg} \rightarrow \text{Mg}^{2+} + 2\text{e}^-$ Mg^{2+} is isoelectronic with neon

b) O^{2-} $\text{O} + 2\text{e}^- \rightarrow \text{O}^{2-}$ O^{2-} is isoelectronic with neon

c) Sc^{3+} $\text{Sc} \rightarrow \text{Sc}^{3+} + 3\text{e}^-$ Sc^{3+} is isoelectronic with argon

d) Si^{4+} $\text{Si} \rightarrow \text{Si}^{4+} + 4\text{e}^-$ Si^{4+} is isoelectronic with neon

e) Si^{4-} $\text{Si} + 4\text{e}^- \rightarrow \text{Si}^{4-}$ Si^{4-} is isoelectronic with argon

4. Predict four properties of RbBr_2 .

Because RbBr_2 is an ionic compound, it will probably be a hard crystal, solid at SATP, have high melting and boiling points, and be odourless. From grade 11, it is also very soluble in water and will conduct electricity in solution.