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Chapter 8 (397932)

About this Assignment

Description

Atomic Electron Configurations and Chemical Periodicity

Instructions

Atomic Electron Configurations and Chemical Periodicity

1. KT6 8.P.001. [467290] [Show Details](#)

Write the electron configurations for **Cl** and **Al** using the *spdf* notation. (Type your answer using the format 1s2 2s2 for $1s^2 2s^2$.)

Cl**Al**

Write the electron configurations for **Cl** and **Al** using orbital box diagrams. (Enter your answer using UP to indicate an upwards pointing arrow, DOWN to indicate a downwards pointing arrow, UP/DOWN to indicate two arrows, and BLANK to indicate no arrows.)

Cl

1s 2s 2p 3s 3p

Al

1s 2s 2p 3s 3p

Describe the relationship between each atom's electron configuration and its position in the periodic table.

2. KT6 8.P.003. [467299] [Show Details](#)

Using the *spdf* notation, write the electron configurations for atoms of chromium and iron, two of the major components of stainless steel. (Type your answer using the format 1s2 2s2 for $1s^2 2s^2$.)

Cr

Fe

3. KT6 8.P.006. [489792] [Show Details](#)

Using the spectroscopic and noble gas notations, write electron configurations for atoms of the following elements and then check your answers with [Table 8.3](#). (Type your answer using the format [Ar] 4s2 3d10 4p2 for [Ar] $4s^2 3d^{10} 4p^2$.)

(a) Mercury, Hg

(b) Zirconium, Zr

(c) Sodium, Na

(d) Platinum, Pt

4. KT6 8.P.007. [467560] [Show Details](#)

Use noble gas and *spdf* notations to predict electron configurations for the following metals of the third transition series. (Type your answer using the format [Ar] 4s2 3d10 4p2 for [Ar] 4s² 3d¹⁰ 4p². If the configuration is a noble gas, enter the noble gas in brackets, for example [Ne] for F⁻.)

(a) Tantalum, Ta. The metal and its alloys resist corrosion and are often used in surgical and dental tools.

(b) Platinum, Pt. This metal was used by pre-Columbian Indians in jewelry. It is used now in jewelry and for anticancer drugs and industrial catalysts.

5. KT6 8.P.026. [467507] [Show Details](#)

Arrange the following elements in order of increasing size: Br, Tl, Cl, As, and Pb. (Try doing it without looking at [Figure 8.11](#), then check yourself by looking up the necessary atomic radii.)

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6. KT6 8.P.031. [467569] [Show Details](#)

Compare the elements Na, Mg, O, and P.

(a) Which has the largest atomic radius?

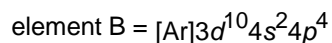
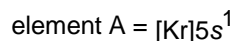
(b) Which has the most negative electron affinity?

(c) Place the elements in order of increasing ionization energy.

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7. KT6 8.P.047. [467233] [Show Details](#)

Answer the questions below about the elements A and B, which have the electron configurations shown.



(a) What is element A?

- metalloid
- metal
- nonmetal

(b) Which element has the greater ionization energy?

- element A

- element B
- (c) Which element has the less negative electron affinity?
- element A
- element B
- (d) Which element has the larger atomic radius?
- element A
- element B

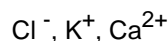
8. KT6 8.P.050. [467556] [Show Details](#)

Place the following elements and ions in order of decreasing size: K^+ , Cl^- , S^{2-} , and Ca^{2+} .

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9. KT6 8.P.052. [467430] [Show Details](#)

The following are isoelectronic species.



- (a) Rank them in order of increasing size.
- $K^+ < Cl^- < Ca^{2+}$
- $Cl^- < Ca^{2+} < K^+$
- $Ca^{2+} < K^+ < Cl^-$
- (b) Rank them in order of increasing ionization energy.
- $K^+ < Ca^{2+} < Cl^-$
- $Ca^{2+} < K^+ < Cl^-$
- $Cl^- < K^+ < Ca^{2+}$
- (c) Rank them in order of increasing electron affinity.
- $Cl^- < K^+ < Ca^{2+}$
- $Ca^{2+} < K^+ < Cl^-$
- $K^+ < Ca^{2+} < Cl^-$

10. KT6 8.P.058. [489827] [Show Details](#)

Which ions in the following list are not likely to be found in chemical compounds: Al^{4+} , Se^{2-} , B^{4+} , Mg^{2+} , and Li^{2+} ?

- B^{4+}
- Li^{2+}
- Se^{2-}
- Al^{4+}
- Mg^{2+}

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