

D63 POD

- Which of the following properties generally decreases across the periodic table from sodium to chlorine?
 - First ionization energy
 - Atomic Mass
 - Electronegativity
 - Maximum value of oxidation number
 - Atomic Radius
- The effective nuclear charge experienced by the outermost electron of Na is different than the effective nuclear charge experienced by the outermost electron of Ne. This difference best accounts for which of the following?
 - Na has a greater density at standard conditions than Ne.
 - Na has a lower first ionization energy than Ne.
 - Na has a higher melting point than Ne.
 - Na has a higher neutron to proton ratio than Ne.
 - Na has fewer naturally occurring isotopes than Ne.
- In the electroplating of nickel, 0.200 faraday of electrical charge is passed through a solution of NiSO_4 . What mass of nickel is deposited?
 - 2.94g
 - 5.87g
 - 11.7g
 - 58.7g
 - 294 g
- A pure crystalline solid dissolves in water to yield a basic solution that liberates a gas when excess HCl is added to it. On the basis of this information, the solid could be
 - KNO_3
 - K_2CO_3
 - KOH
 - KHSO_4
 - KCl

Write the Net Ionic Equation for each:

- Hydrogen chloride gas is oxidized by oxygen gas.

If three moles of hydrogen chloride gas and three moles of oxygen gas react as completely as possible, which reactant, if any, is present in excess? Justify your answer.

- Solid potassium oxide is added to water.

If a few drops of phenolphthalein are added to the resulting solution, what would be observed? Explain.

Think Pair Share Atomic Structure 1

1. What is the electron configuration of Nickel? Of Nickel (II) ion?
2. What is the atomic orbital notation of Nickel? Is it paramagnetic or diamagnetic?
3. Compare and Contrast the electron configuration of
A. Na^{+1} and Ne B. Co^{+2} and Ar
4. Compare and contrast the atomic radius of Na and Cl.
5. Compare and contrast the size of Na^{1+} to Na.
6. What is the equation that relates the speed of light to its frequency (ν) and wavelength (λ)? See page 268
7. What is the equation that relates change in energy (ΔE) to frequency? See page 273
8. What is the equation for solving for the energy of a level in the hydrogen atom? (E_n) see page 276
9. Based upon your answers for #'s 6-8 calculate the wavelength for the ΔE when an electron in the hydrogen atom jumps from level 1 to level 3. See page 277
10. What are the three different "series" for electrons jumping from one level to another and how are these series determined or how are the lines determined that make up a series? See page 279.

Atomic Structure WS #1

1. What is the electron configuration and atomic orbital notation of silicon?
2. What is the electron configuration and atomic orbital notation of cobalt?
3. What is the electron configuration and atomic orbital notation of Sn^{+4} ?
4. Of the silicon, cobalt, & Sn^{+4} , which one(s) are paramagnetic?
5. Is ROYGBIV from 400 – 700 nm or 700 – 400 nm? Which color has the largest energy and which color has the smallest energy? Explain what the relationship (direct or indirect and the formula) is between these two things (wavelength and ΔE)?
6. Explain how Rutherford's Gold Foil experiment helped him determine the existence of a nucleus and the atom being mostly empty space?
7. What is the energy of the first 4 energy levels of the hydrogen atom? ($R=2.179 \times 10^{-18}\text{J}$)
8. What is the energy change from an electron transition $n=4$ to $n=3$?
9. What is the frequency of an electron transition from $n=4$ to $n=2$?
10. What is the wavelength of an electron transition from $n=3$ to $n=1$
11. What special series is associated with $n=1$ as the low energy level in a transition?
12. What special series is associated with $n=2$ as the low energy level in a transition?
13. What special series is associated with $n=3$ as the low energy level in a transition?
14. List the names of the important people (at least 6) in atomic structure history and what each one discovered.