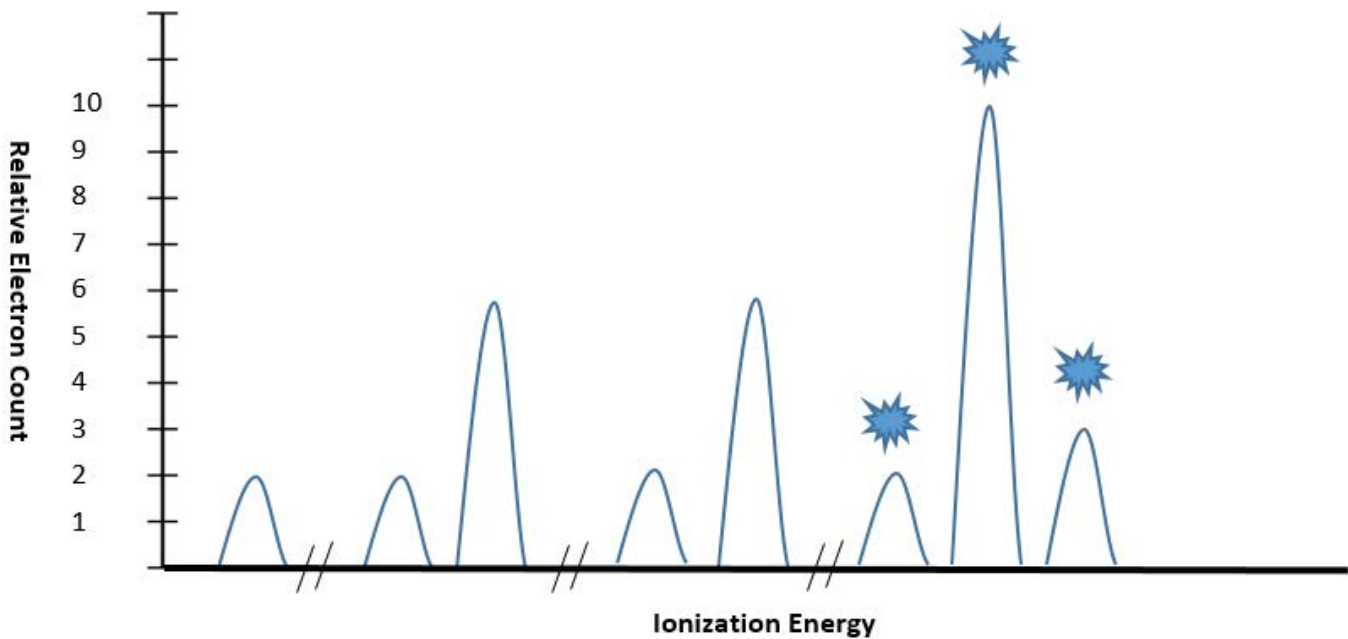


- 1) A scientist acquired the following photoelectron spectrum from a pure elemental sample.



- What is the element? (1 pts)
- Write the electronic configuration of the element in noble gas notation. (1 pts)
- Write the electronic configuration of this element in box notation (you only need to show the electrons for the shells marked with stars). (2 pts)
- This element is ionized to its +1 ion. What are the principal (n) and angular momentum (l) quantum numbers of the electron that's lost? (2 pts)

- 2) The solution provided contains potassium chloride (KCl) dissolved in water: use it to answer the following questions.
- What is the conductivity of the solution? Assume the baseline conductivity of the water is negligible. (1pt)
 - Is the solid ionic or covalent? Why? (1pt)
 - Does magnesium oxide (MgO) have a higher or lower lattice energy than potassium chloride? Justify your answer. (2 pts)
 - One mole of potassium chloride (KCl) and one mole of nickel(II) chloride (NiCl₂) are dissolved in equal volumes of water. Which would have a higher conductivity? (1 pt)

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3.091 Introduction to Solid-State Chemistry
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