**Name: Period: Seat#:**

**Worksheet #7**

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| 1. In a photoelectron spectrum, photons of 165.7 MJ/mol strike atoms of an unknown element. If the kinetic energy of the ejected electrons is 25.4 MJ/mol, what is the ionization energy of the element? *140.3 MJ/mol*
 |
| 1. What determines the position and the height (intensity) of each peak in a photoelectron spectrum?
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| 1. Why is the distance of the energy level from the nucleus important in determining the corresponding peak position in the photoelectron spectrum?
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| 1. The ionization energy of an electron from the first energy level of lithium is 6.26 MJ/mol. The ionization energy of an electron for the second energy level of lithium is 0.52 MJ/mol.

* 1. Write the electron configuration for lithium.
	2. Sketch the photoelectron spectrum for lithium; include the values of the ionization energies stated above and label peaks.
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| 1. Based on the information provided below, draw a photoelectron spectrum for argon.

Indicate the relative intensities and positions of all peaks.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1s2 | 2s2 | 2p6 | 3s2 | 3p6 |
| -309.0 | -31.5 | -24.1 | -2.83 | -1.52 |

 |
| 1. Identify the element in the photoelectron spectrum shown below.

Explain your reasoning.  | Explain here: |
| 1. Identify if either of the following statements is correct. If yes, why. If not, why not:
2. The photoelectron spectrum of Mg2+ is expected to be identical to the photoelectron spectrum of Ne.

1. The photoelectron spectrum of 35Cl is identical to the photoelectron spectrum of 37Cl.
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| 1. Is it possible to deduce the electron configuration for an atom from its photoelectron spectrum? If so, explain how. If not, explain why not.
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| 1. Why is the peak at 0.42 MJ/mol in the K photoelectron spectrum identified as being in the 4th energy level?

 | Explain here:  |