**Name: Period: Seat#:**

**Worksheet #6**

1. Below is the PES of sulfur, and a table of successive ionization energies.  The energy scale for the PES is in MJ/mol (1 MJ = 1000 kJ).  There is exactly one peak on this graph whose energy corresponds to an ionization energy in table 7.2.  What is it?  Why doesn't anything else match up?

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| sulfur PES | Explain here:  *From Brown et al., Chemistry the Central Science 12 ed.,  copyright Pearson Prentice Hall* |
| Successive ionization energies |

1. Here is a picture of the original Bohr model of lithium (Z=3), and next to it, the PES of lithium. Is there anything in the PES data for this element that requires revision of the Bohr model? Explain.

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| --- | --- |
| http://www.americanelements.com/lithium-bohr.jpg | Explain here: |

1. Similarly, here is the original Bohr model of carbon and the corresponding PES. Is there anything in the PES data for this element that requires revision of the Bohr model? Explain.

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| http://goose.ycp.edu/%7Edricker/CarbonAtom.gif | Explain here: |

1. Here is a PES spectrum of boron (Z=5) superimposed on that of fluorine (Z=9)

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| F  F  B  B  B  F | 1. Why are the fluorine peaks to the left of the boron peaks? |
| 1. Why is there one peak in fluorine that is so much taller than all the others? |

1. Below is shown the PES spectrum of sulfur (atomic number = 16)

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| H:\My Documents\AP Chem 2013-2014\Chapter 6 - atomic theory\Sulfur PES.JPG |
| 1. Write the full electron configuration of sulfur |
| 1. Label each peak in the spectrum to show which subshell it represents (i.e., 1s, 2s, etc.) **On diagram above** |
| 1. On the spectrum, sketch in the relative locations and correct peak heights for the spectrum of aluminum (atomic number = 13). By relative location, I mean correctly to the left or right of the same subshell peak in the sulfur spectrum. **On diagram above** |
| 1. Draw a circle around the sulfur peak whose energy is equal to the first ionization energy of sulfur.  **On diagram above** |