Photoelectron Spectroscopy (PES) Data for Alien Universe   **CHEM151 Fall 2016 [Kua]**

Appanosu	0.58 (1), 0.70 (1), 1.03 (3), 8.82 (3), 9.47 (1), 9.70 (3)
Aridate	1.09 (3), 1.26 (1), 1.69 (3)
Buma	1.13 (3)
Copylate	0.84 (3), 0.97 (1), 1.30 (3), 9.70 (3), 10.2 (1), 10.4 (3)
Dupinate	1.02 (3), 1.15 (1), 1.28 (3), 6.50 (3), 6.82 (1), 7.11 (3), 41.6 (3), 43.8 (1), 45.3 (3)
Durma	0.45 (1), 0.65 (3), 6.70 (3), 6.94 (1), 7.17 (3), 31.0 (3), 33.8 (1), 35.1 (3), 169 (3), 182 (1), 200 (3)
Etheriot	0.47 (2), 0.59 (1), 0.84 (3), 7.15 (3), 7.40 (1), 7.66 (3), 37.5 (3), 40.0 (1), 44.1 (3), 205 (3), 221 (1), 242 (3)
Flurima	0.60 (2), 6.25 (3), 6.51 (1), 7.03 (3), 31.9 (3), 34.2 (1), 37.7 (3), 172 (3), 181 (1), 199 (3)
Gosima	0.45 (1), 6.02 (3), 6.33 (1), 6.80 (3), 29.7 (3), 31.4 (1), 34.0 (3), 156 (3), 170 (1), 185 (3)
Herpolate	0.78 (1), 1.03 (1), 1.42 (3)
Hoterol	0.49 (3), 6.40 (3), 6.65 (1), 6.96 (3), 28.7 (3), 29.6 (1), 32.4 (3), 154 (3), 167 (1), 182 (3)
Hyttima	0.73 (2), 7.44 (3), 8.01 (1), 8.28 (3)
Islox	0.71 (2), 0.85 (1), 1.12 (3), 7.02 (3), 7.19 (1), 7.65 (3), 40.4 (3), 44.0 (1), 48.6 (3), 231 (3), 245 (1), 260 (3)
Jomate	0.52 (3), 0.60 (1), 0.76 (3), 6.77 (3), 6.98 (1), 7.35 (3), 38.1 (3), 41.0 (1), 43.6 (3), 194 (3), 205 (1), 227 (3)
Juveniot	0.64 (1), 0.75 (1), 0.97 (3), 6.83 (3), 7.02 (1), 7.47 (3), 38.1 (3), 41.9 (1), 45.5 (3), 216 (3), 228 (1), 246 (3)
Jyma	0.42 (1), 0.52 (1), 0.75 (3), 6.98 (3), 7.17 (1), 7.40 (3), 33.6 (3), 35.8 (1), 39.0 (3), 186 (3), 197 (1), 219 (3)
Kyplox	0.70 (1), 0.79 (1), 0.91 (3), 6.28 (3), 6.51 (1), 6.77 (3), 38.7 (3), 40.2 (1), 42.5 (3)
Lyka	0.39 (1), 0.44 (1), 0.63 (3), 6.40 (3), 6.61 (1), 7.02 (3), 33.4 (3), 36.7 (1), 38.0 (3), 170 (3), 182 (1), 195 (3)
Meluma	0.34 (1), 6.14 (3), 6.40 (1), 6.69 (3), 24.1 (3), 26.0 (1), 28.3 (3), 130 (3), 139 (1), 152 (3)
Merkima	0.54 (1), 6.85 (3), 7.31 (1), 7.97 (3)
Mollima	0.90 (3), 7.89 (3), 8.51 (1), 8.66 (3)
Nobiluki	0.51 (3), 6.12 (3), 6.36 (1), 6.70 (3), 29.5 (3), 32.0 (1), 33.8 (3), 153 (3), 164 (1), 178 (3)
Oggil	0.85 (1)
Perlima	0.52 (1), 5.15 (3), 5.44 (1), 5.80 (3), 31.7 (3), 33.0 (1), 37.8 (3)
Prynox	0.65 (1), 0.99 (3), 8.32 (3), 8.94 (1), 9.13 (3)
Tytop	0.70 (2), 0.85 (1), 1.11 (3), 9.16 (3), 9.67 (1), 9.89 (3)
Unota	0.80 (3), 0.96 (1), 1.25 (3), 7.24 (3), 7.40 (1), 7.88 (3), 43.1 (3), 47.9 (1), 52.1 (3), 261 (3), 280 (1), 295 (3)
Votiki	0.69 (1), 0.88 (3), 6.72 (3), 6.91 (1), 7.33 (3), 36.0 (3), 39.8 (1), 43.2 (3), 201 (3), 214 (1), 228 (3)
Wolima	0.40 (2), 6.22 (3), 6.49 (1), 6.80 (3), 26.4 (3), 27.5 (1), 30.0 (3), 140 (3), 151 (1), 165 (3)
Zima	0.76 (3), 5.93 (3), 6.22 (1), 6.54 (3), 35.0 (3), 38.9 (1), 41.1 (3)

*Energies are in units of MJ/mol. Due to limitations of the instrument, energies higher than 500 MJ/mol could not be measured.
**Numbers in parenthesis give the relative number of "electrons" assuming the alien atoms have a shell structure similar to ours.

Element Assignment #2: Building an Alien Periodic Table from PES Data   **CHEM151 Fall 2016 [Kua]**

This assignment is due via e-mail sometime on Monday, Oct 03 (i.e. before 11:59pm).

You may work in groups, or individually. If you work in a group, be sure that the names of all group members are listed in the document.

<u>Assignment Instructions</u>:

The first ionization energy (or PES) values of elements in an alien universe are shown in the Table on the reverse side.

(a) Sketch its Periodic Table.
(b) Are there any elements that might be "missing" from this data set? If so, suggest any properties this element should have, and why you think it is a missing element. [If desired, you may also pick creative names for any such elements and give a one-sentence reason why you picked that name.]
(c) Assuming a Bohr-like model of the atom with shells and subshells, use the data to suggest the electronic structure of atoms in this alien universe.