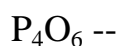


Homework #10
(Bond types, resonances, hybridization)
CHEM 11 (S 2016, LAC)
 (Due Friday, May 6)

1. Write the correct name for each of the following compounds and note whether you would expect each one to be composed of non-polar covalent, polar covalent, or ionic bonds? Answer this question by finding the difference in electronegativity between the two atoms involved.



2. Write one possible Lewis structures for the oxalate ion ($\text{C}_2\text{O}_4^{2-}$). In this ion, the two carbons are bonded together and each of them has two oxygen atoms bonded to it. Then note by symmetry that this is one of four possible resonance Lewis structures. Write all four of them out.

Periodic table of electronegativity by Pauling scale
 → Atomic radius decreases → Ionization energy increases → Electronegativity increases →

Group → ↓ Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	H 2.20																	He
2	Li 0.98	Be 1.57											B 2.04	C 2.55	N 3.04	O 3.44	F 3.98	Ne
3	Na 0.93	Mg 1.31											Al 1.61	Si 1.90	P 2.19	S 2.58	Cl 3.16	Ar
4	K 0.82	Ca 1.00	Sc 1.36	Ti 1.54	V 1.63	Cr 1.66	Mn 1.55	Fe 1.83	Co 1.88	Ni 1.91	Cu 1.90	Zn 1.65	Ga 1.81	Ge 2.01	As 2.18	Se 2.55	Br 2.96	Kr 3.00
5	Rb 0.82	Sr 0.95	Y 1.22	Zr 1.33	Nb 1.6	Mo 2.16	Tc 1.9	Ru 2.2	Rh 2.28	Pd 2.20	Ag 1.93	Cd 1.69	In 1.78	Sn 1.96	Sb 2.05	Te 2.1	I 2.66	Xe 2.60
6	Cs 0.79	Ba 0.89	* Lu 1.27	Hf 1.3	Ta 1.5	W 2.36	Re 1.9	Os 2.2	Ir 2.20	Pt 2.28	Au 2.54	Hg 2.00	Tl 1.62	Pb 1.87	Bi 2.02	Po 2.0	At 2.2	Rn 2.2
7	Fr 0.7	Ra 0.9	** Lr 1.3	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Fl	Uup	Lv	Uus	Uuo
			* La 1.1	Ce 1.12	Pr 1.13	Nd 1.14	Pm 1.13	Sm 1.17	Eu 1.2	Gd 1.2	Tb 1.1	Dy 1.22	Ho 1.23	Er 1.24	Tm 1.25	Yb 1.1		
			** Ac 1.1	Th 1.3	Pa 1.5	U 1.38	Np 1.36	Pu 1.28	Am 1.13	Cm 1.28	Bk 1.3	Cf 1.3	Es 1.3	Fm 1.3	Md 1.3	No 1.3		

Values are given for the elements in their most common and stable oxidation states.

[Source: [http://en.wikipedia.org/wiki/Electronegativities_of_the_elements_\(data_page\)](http://en.wikipedia.org/wiki/Electronegativities_of_the_elements_(data_page))]

3. Find the hybridization for the outer orbitals of the middle carbon of propane (C_3H_8). (It is a linear chain of three carbons with no multiple bonds.) As done in class, write the electron configuration for ethyne using the circles for orbitals on an energy line. From this promote the necessary electrons and show the final hybridization for the orbitals on one of the carbons using squares to show the hybridized orbitals.
4. Similarly (as done in #3), find the hybridization for one of the carbons in ethyne (more commonly called acetylene) (C_2H_2) which has a triple bond between the two carbon atoms.
5. Also, similarly (as done in #3), find the hybridization for the bromine atom in BrF_5 .