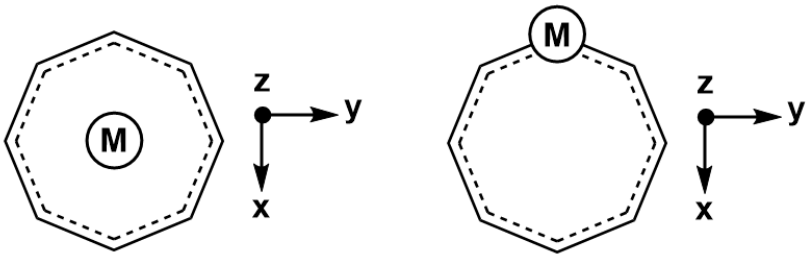
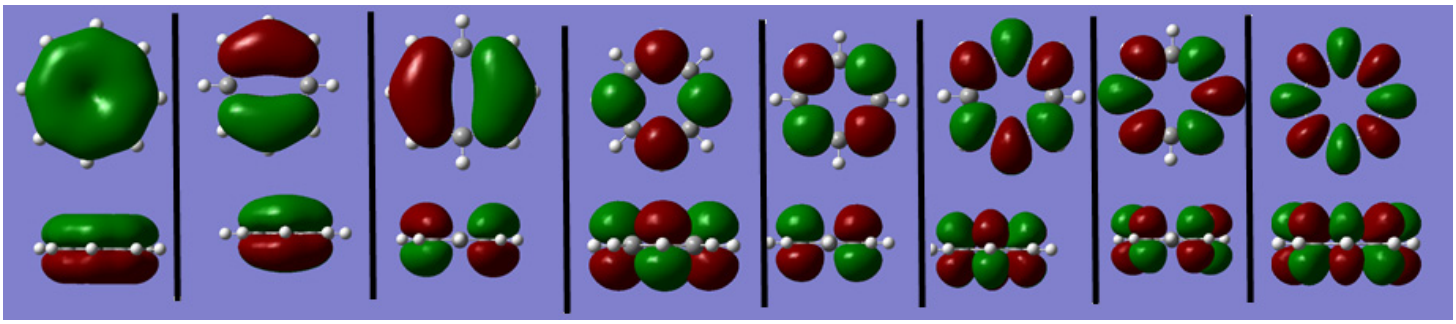
Ch112
In class exercise
Oct 18, 2018

The eight molecular orbitals of the π-system of the cyclooctatetraene dianion (COT, $C_8H_8^{2-}$), an aromatic ion, are shown below in two views, along the z (top) and x (bottom) axis.



For parts 1 and 2 For parts 3 and 4



Axial symmetry along the principal rotation axis							
Metal orbitals of correct symmetry to interact							
			d_{x2-y2}…				
Axial symmetry along an axis directly above one of the carbon atoms							
Metal orbitals of correct symmetry to interact							
	p_z…						

1. What is the axial symmetry of the eight molecular orbitals of $C_8H_8^{2-}$ along the principal rotation axis? (fill chart above)
2. Consider a metal ion interacting with these orbitals along the principal rotation axis. Which metal orbitals (s, p, d, f) have the correct axial symmetry to interact with each of the eight molecular orbitals of $C_8H_8^{2-}$? (fill chart above)
3. What is the axial symmetry of the eight molecular orbitals of $C_8H_8^{2-}$ along an axis defined by the p_z orbital of the top carbon in the view along the z axis? (fill chart above) Consider electron density that is 2 C-C bonds away (or further) to be too far to interact.
4. Consider a metal atom interacting with these orbitals along the axis described in 3. Which metal orbitals (s, p, d, f) have the correct axial symmetry to interact with each of the eight molecular orbitals of $C_8H_8^{2-}$? (fill chart above)