Hybrid Orbitals

HYBRID ORBITALS	NUMBER OF ORBITALS	Electron Domain GEOMETRY
sp	2	linear
sp^2	3	trigonal planar
sp^3	4	tetrahedral
sp^2d	4	square planar
sp^3d	5	trigonal bipyramidal
sp^3d^2	6	octahedral

EXERCISES

A. Consider the molecule BeH_2.

1) Show the electronic structure of beryllium's valence shell. Use arrows to represent the electrons contained in each orbital.

Be _____ _____ _____ _____
2s 2p

2) How many covalent bonds does the Be atom form with the H atoms?

3) Therefore, the beryllium atom should provide _____ half-filled orbitals.
How many?

4) This is accomplished by creating a pair of _____ hybrids and placing _____ electron(s) in each of them. Show this in the following diagram, using up arrows (↑) to represent beryllium's electrons. Label the orbitals:

Be* _____ _____ _____ _____

5) Show the orbital diagram for the beryllium atom in the BeH_2 molecule, using down arrows (↓) to represent electrons from hydrogen:

Be* _____ _____ _____ _____

6) What electron domain (ED) geometry does this molecule have?

B. Consider the molecule CH_4.

1) Show the electronic structure of carbon's valence shell. Use arrows to represent the electrons contained in each orbital.

C: _____ _____ _____ _____
2s 2p

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