

**sp Hybridization:**

In **sp** hybridization one S-orbital and and P-Orbitals of nearly same energy inter-mix with each other by redistributing their energies and converts to a equal energy **sp** Hybrid orbitals. As one S-orbital and one P-Orbitals involved, it give two equal energy sp hybrid orbitals having identical Size and Shape. The shape of the molecule is linear and the percentage of S-Character is 50% and the percentage of P-Character is 50%

**\* Examples of molecule having sp hybridisation:**

When two out of the four valence orbitals of carbon atom in excited state hybridize, we have two sp hybrid orbitals lying in a plane and inclined at an angle of  $180^\circ$ . If 2s and 2p, orbitals of the excited carbon atom are hybridized, the new orbitals lie in the line while the pure  $2p_y$  and  $2p_z$  orbitals lies at right angles to the hybridized orbitals with its two lobes disposed above and below the plane of hybrid orbitals.

In the formation of ethyne two carbon atoms (in sp hybridization state) form one sigma bond by 'head-on' overlap of two sp orbitals contributed one each by the two atoms. The remaining one sp orbital of each carbon form s bonds with H atom. The unhybridized  $2p_y$  and  $2p_z$  orbitals of the two carbon atoms undergo a side-wise overlap forming two p bonds. Thus the carbon to carbon triple bond in ethyne is made of one s bond and two p bond. The molecule is a linear one.

