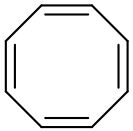
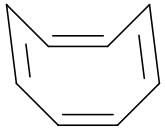
Annulenes

[8] Annulene



[8] Annulene



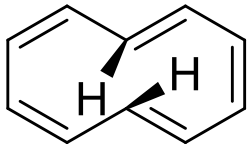
Cyclooctatetraene can be assumed to have a planar cyclic conjugated system which has 8 pi Electrons.

To overcome this strain molecule assumes a non-planar, tub-shaped geometry.

Tub shaped structure is not planar antiaromatic (as nonplanairty hinders delocalization).

Hence it is non-aromatic contrary to expected anti aromatic.

[10] Annulene

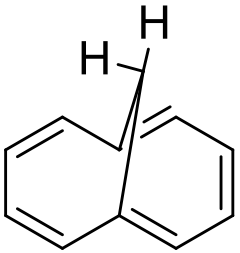


[10] Annulene

According to the Huckel's rule this molecules should be aromatic but the fact this molecules is non-aromatic because this is unable to adopt the necessary planar configuration.

Planarity is lost as the two H atoms facing each other inside the ring pose steric hinderence to each other and as a result planarity is lost

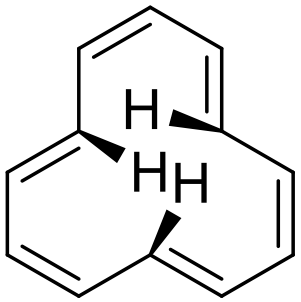
Bridgehead [10] Annulene



[10] Annulene

if two internal 'H' of [10] annulene are replaced by a methylene bridge above the molecule, the strain can be overcome, and it can acquire a flat geometry

[12] Annulene



[12] Annulene

The three H in-between the ring are far enough therefore do not contribute strain for the planar arrangement. This molecule is cyclic, planar system having continuous delocalisation of pi electrons

Since the number of pi electrons are 12, this molecule is anti-aromatic in nature.