

RELATIVE AROMATICITY OF PYRROLE, FURAN AND THIOPHENE

Furan, Pyrrole and Thiophene each consists of a flat ring of four carbon atoms and a hetero atom with a cyclic electron cloud of six delocalised π -electrons (Sextet). So according to Huckel rule, all these compound shows aromatic character.

All the three compounds have five contributing structure in which there is only one structure in each case which does not involve charge separation. The relative aromaticity of Pyrrole, Thiophene and Furan depends upon the electro-negativities of the hetero atoms present in pyrrole, Furan and Thiophene and it is in the order as follows :



It means oxygen has very less tendency to release or donate its pair of electrons to the aromatic sextet. So number of ionic resonating structure should be least in case of Furan followed by Pyrrole and should be maximum in case of Thiophene. So the order of aromaticity will be



All these heterocycles are less aromatic than benzene as all the resonating structures of benzene are uncharged and equally stable and involves no separation of +ve and -ve charges. The resonance energies of these heterocycles is less than that of benzene. So the aromatic character of these heterocycles relatives to benzene decreases in order as

