

TDC Part I
Paper I, Group B
Inorganic Chemistry



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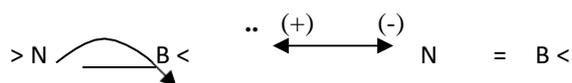
TOPIC: - p-block group 13
Boron-nitrogen compounds

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The B-N bond is isoelectronic with the C-C bond and parallels between boron-nitrogen compounds with organic compounds are known. One of the best known of these pairs is benzene and the isoelectronic borazine also known as inorganic benzene, $B_3N_3H_6$

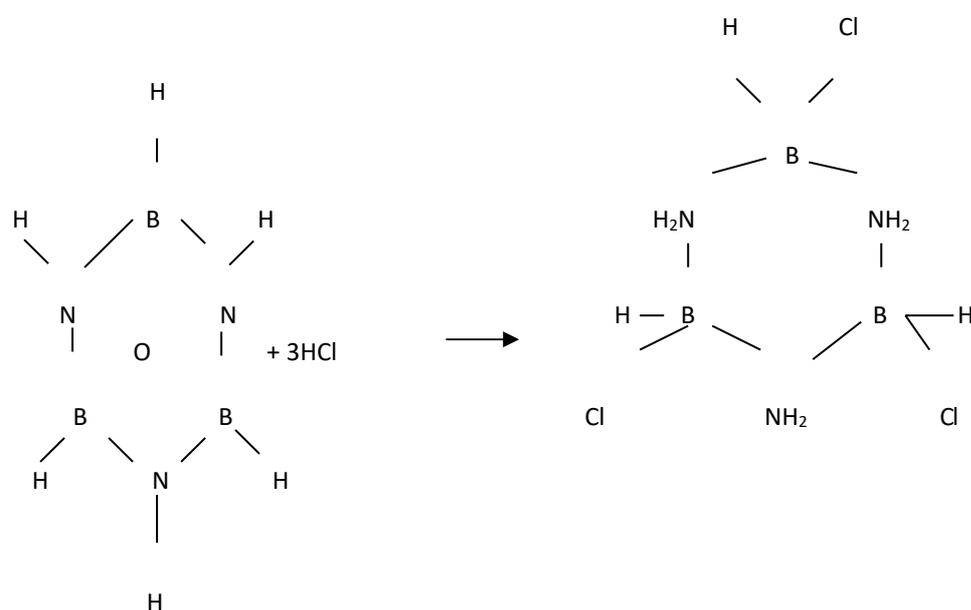


The compounds are structurally similar and also exhibit similar physical properties. However, the chemical properties are widely different. The nature of the π -bond in borazine and benzene differ. In benzene the π – bond is formed by sideways overlap of the 2p orbitals of carbon atoms and the two atoms involved in π bond formation do not differ in electro negativity. In borazine the nitrogen atom donates an unshared electron pair to a vacant p orbital on B, thereby forming a π bond



The polarity of the B-N bond is less than what is expected on basis of electro negativity difference between boron and nitrogen. This is because during σ - bond formation the electron density shifts towards the more electronegative atom, nitrogen while the

reverse happens during π bond formation. The molecule however is polar and undergoes addition reactions.



This is in sharp contrast to benzene, which does not undergo addition reaction.

Another interesting compound is boron nitride, BN. Like carbon it exists in two forms – a diamond – like form and another form like graphite, which comprises of six-membered rings fused together (Fig.11)

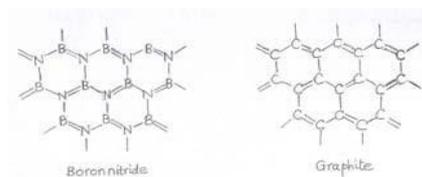


Fig. 11: Similarity in structures of Boron Nitride and Graphite

