

Since last few decade enormous developments in organic macrocycles domain have allowed proliferation of a variety of molecular structures. Facile synthetic methodologies and availability of building blocks have greatly contributed to the development of organic macrocycles such as crown ethers, cryptands, calixarenes, cyclophanes and many more. Contrary to this, the macrocyclic structures where the framework contains inorganic elements also are relatively less known and have recently started to attracted attention and consequently some important breakthrough has been witnessed. The work presented in the thesis highlights the key differences between the organic vs inorganic macrocycles in terms of the synthetic approaches, chemical properties and possible applications. The results obtained during the current investigations showcase the syntheses of a variety of molecular topologies (macrocycles, bicyclic systems, calix like structures etc.) all based on main group elements (groups 13-16). The inorganic moieties that constitute the main skeleton of these cyclic structures are combinations of phosphorus/nitrogen, (P/N); boron/nitrogen, (B/N) or aluminum/nitrogen, (Al/N) functionalities whereas, the remaining portion of the molecules are completed using simple organic fragments. For example, a hexameric macrocycle with sulfur bridged phosph(III)azane units and related biradicaloid dianion (that assembled as 2D and 3D polymers in the solid state) are remarkable. The feasibility of diaminopyridine and derivatives of melamine and triazine in assembling macrocycles that incorporate group 13 elements (B and Al) have also been discussed with new examples of conformationally rigid B/N-pyridinophanes, Al/N-pyridinophanes, Al/N-pyridine bicyclic macrocycles and B/N-calixarenes.