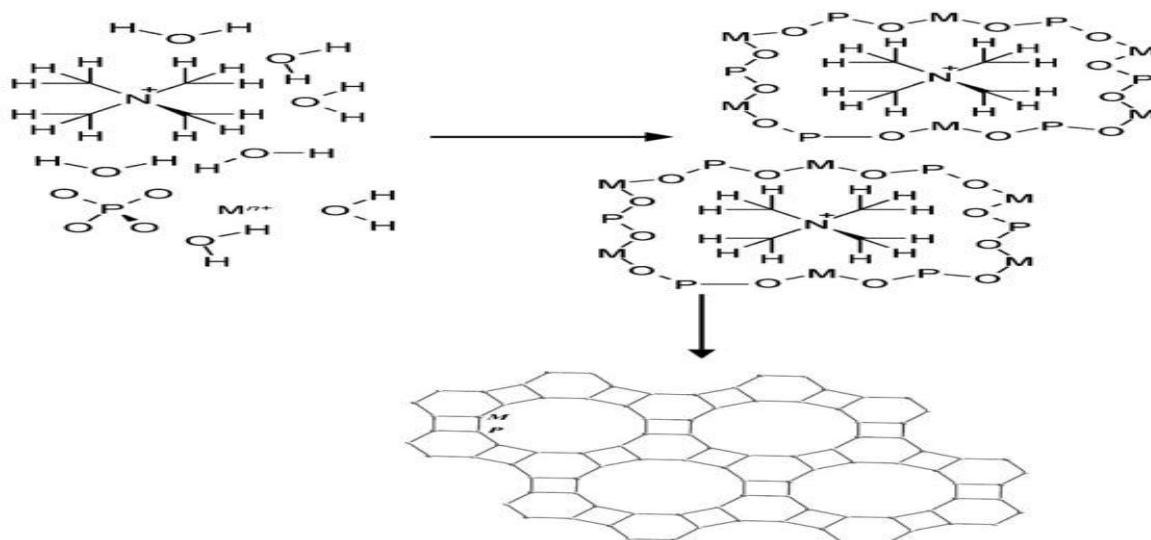


Open Frame Work Compound Of Transition Metal

Research in open framework structure continue due to its large potential application and it have large channels and cavities that can be used in catalysis and related studies.

The actual beginning of these structures in early 1980s when Flanigen and co-workers discovered aluminophosphate structure thus give a rise to a flurry of activity resulting in many structures with different dimensionality . Presently compound that exhibit open structure are known for most of the elements of periodic table .

In general the structure formed by tetrahedral or octahedral linked through their vertices .



the formation of an open frame work solid can be outlined , The reactive species (hydrated metal ion and phosphate) arrange themselves around organic amine to form arranged complex ,which is the nucleation center for growing structure ,to form final compound . It has be a sutble balance between reactive species, amine and solvent. The amine play three role: templating, structure direction and space filling. And solvent play vital role in success of an attempted synthesis, It is facilitate the interaction between the framework particles and the amine molecule. Presently there are a new solvent approaches like non aqueous solvent, ionic liquid or solid state reaction.

Now there are large numbers of framework include (silicate – phosphate – arsenate – sulfate – selenate – selenite – germanate and phosphite) . In addition to structure with one type of anion, there are a new approaches of forming new network structures :

1. Hybrid compounds (mixed oxo anions) like metalloborophosphate compounds with two oxo anions borate and phosphate, thus have more than one building units $((\text{BPO}_6)^{-4} - (\text{BP}_2\text{O}_8)^{-3} - [\text{BP}_2\text{O}_{10}]^{-7})$ which give a large variety of structures.
2. Organic – Inorganic Hybrid compound have great potential to form compound with novel extended network. Compound based on oxalate anions along with framework particles and oxalate unit act as glue connecting two inorganic moieties.

A main impetus to study transition metal based compound is to investigate the interaction between unpaired electrons, Generally magnetic properties depend on the number of unpaired electron, the site symmetry of the magnetic ions and M-O/ F-M angle if the angle equal 90° it be ferromagnetic interaction but if the angle equal 180° it be antiferromagnetic interaction. To quantify these interaction different models have been employed, but the simplest one is Heisenberg model $\mathcal{H} = -J \sum S_i S_j$ where S_i, S_j : spin quantum numbers of i th and j th atom, J : the exchange coupling constant.

The value and the sign of J determine the magnetic properties

$J > 0$: ferromagnetic, $J < 0$: antiferromagnetic

Finally the development of these structures will continue with helping a computational approaches towards design and prediction of topologies.