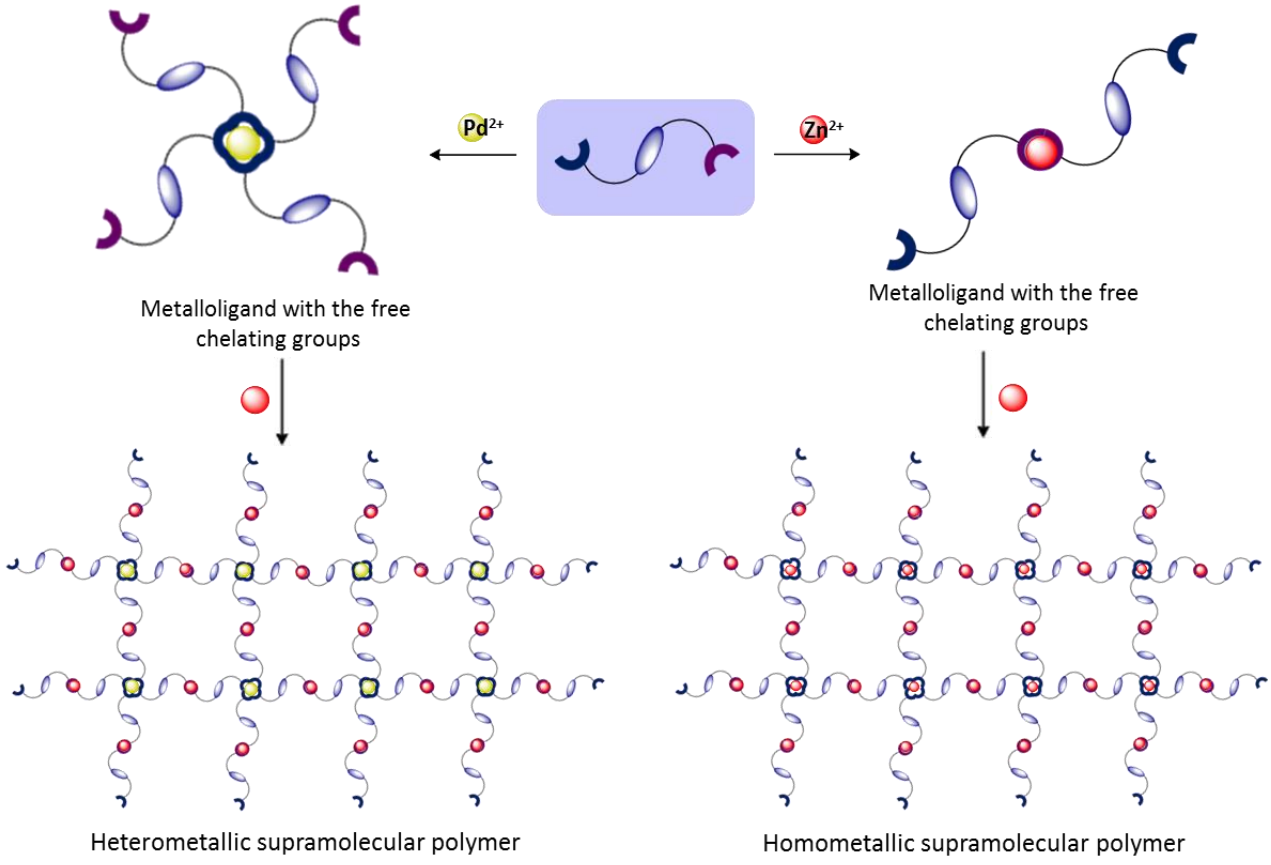
Generation of new homo- and heterometallic supramolecular polymers based on hierarchical self-assembly processes

Synthesis of proposed coordination structures will be carried out by strategic application of self-assembly process, where precisely designed building blocks (ligands) will be connected by a metal ions with well-defined coordination geometry. The processes of self-association and self-organization have already been widely used to obtain MOF (metal-organic frameworks) materials with interesting e.g. catalytic, or binding properties. Careful design of the organic ligands with a specific number and type of donor atoms, will provide materials with defined pore size, or polymers with predictable physicochemical properties and structural characteristics. The possibility of introducing additional metal ions to the previously prepared supramolecular complex will lead to the affordable wide variety of new functional supramolecular materials with exciting structural properties and functions (complexing, luminescent, magnetic, spectral, catalytic, or optical), and can result in the use of these structures as modern materials in functional nanotechnology.



Metallosupramolecular architectures are an important class of materials because of their interesting properties, extensive spatial structure (1-, 2- or 3-dimensional) and porosity. Such systems have a wide range of functions (sorption, separation), which come from their physicochemical and structural properties (magnetic, luminescent, conductive, high surface area). Control over structural and physicochemical properties in supramolecular systems has been demonstrated to have nano-technological applications that were not envisaged when they were first formed. The proposed research employs a pioneering hierarchical self-assembly approach to the design and synthesis of new type of functional metallosupramolecular architectures with predictable structure and, more importantly, predictable functions.