STEPS TOWARDS COMPLEX MATTER

From Supramolecular Chemistry Towards Adaptive Chemistry

Jean-Marie LEHN

ISIS, Université de Strasbourg, France

Supramolecular chemistry is intrinsically a *dynamic chemistry* in view of the lability of the interactions connecting the molecular components of a supramolecular species and the resulting ability to exchange components. The same holds for molecular chemistry when the molecular entity contains covalent bonds that may form and break reversibly. These features allow for a continuous change in constitution by reorganization and exchange of building blocks and define a *Constitutional Dynamic Chemistry* (CDC) covering both the molecular and supramolecular levels.

CDC takes advantage of dynamic diversity to allow variation and selection and operates on dynamic constitutional diversity in response to either internal or external factors to achieve *adaptation*.

It generates networks of dynamically interconverting constituents, *constitutional dynamic networks*, that may respond to perturbations by physical stimuli or to chemical effectors. Of special interest is the case where the driving force is an *increase in organization/order*.

The implementation of these concepts points to the emergence of *adaptive* and *evolutive chemistry,* towards *systems of increasing complexity.*