

Supramolecular Chemistry Concepts and Perspectives

Jean-Marie Lehn

Collège de France, 11, Place Marcelin Berthelot, Paris and ISIS, Université Louis Pasteur, 4, rue Blaise Pascal, Strasbourg

Beyond molecular chemistry, based on the covalent bond, lies the field of *supramolecular chemistry*, the chemistry of the intermolecular bond and of the structures and functions of the supermolecules formed by the binding of substrate species to a molecular receptor.

Numerous receptors capable of selectively binding specific substrates have been developed. They perform *molecular recognition* which rests on the *molecular information* stored in the interacting species. Suitably functionalized receptors may perform *supramolecular catalysis* and selective *transport processes*. In combination with polymolecular organisation, recognition opens ways towards the design of *molecular* and *supramolecular* devices based on functional (photoactive, electroactive, ionoactive, etc.) components.

Supramolecular chemistry has relied on more or less preorganised molecular receptors for effecting molecular recognition, catalysis and transport processes. A step beyond consists in the design of systems undergoing *self-organisation*, i.e. systems capable of spontaneously generating a well-defined supramolecular architecture from its components in a given set of conditions. The *molecular information* necessary for the process to take place must be stored in the components and acts through selective molecular interactions.

The design of molecular information dependent, "*programmed*" and functional self-organising systems represents new horizons in chemistry towards a science of informed and organized matter.

