Pozivamo Vas na predavanje koje će održati

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Perspectives in Chemistry: From Supramolecular Chemistry towards Adaptive Chemistry

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Nobelovu nagradu za kemiju (1987) prof. Lehn dobio je za svoja istraživanja o kemijskom temelju za "molekularno prepoznavanje" koje igra fundamentalnu ulogu u biološkim procesima. Tijekom godina njegov rad ga je doveo do definiranja novog polja kemije nazvanog "supramolekularna kemija" koje se bavi složenim entitetima koji nastaju udruživanjem dvije ili više kemijskih vrsta, a koje se drže zajedno pomoću ne-kovalentnih intermolekulskih sila. Nakon toga, polje "supramolekularne kemije" razvilo se u kemiju "samoorganizacijskih" procesa i u "adaptivnu kemiju".

Tijekom godina, u znanstvenoj karijeri, prof. Lehn surađivao je s više od 300 suradnika iz dvadesetak zemalja što je rezultiralo s oko 800 objavljenih publikacija i stručnih radova, kao i dvije knjige. Uz dobivanje Nobelove nagrade, vrijedno je istaknuti da je prof. Lehn 1980. godine izabran za profesora na uglednom Collège de France, a dobitnik je i niza nagrada: Commander of the Légion d'Honneur (1996), Officer of the Ordre National du Mérite (1993), Knight of the Ordre des Palmes Académiques (1989), Österreichisches Ehrenzeichen für Wissenschaft und Kunst (first class, 2001) i ISA Medal for Science (2007).

Sažetak predavanja: Perspectives in Chemistry: From Supramolecular Chemistry towards Adaptive Chemistry

Supramolecular chemistry is actively exploring systems undergoing self-organization, i.e. systems capable of spontaneously generating well-defined functional supramolecular architectures by self-assembly from their components, on the basis of the molecular information stored in the covalent framework of the components and read out at the supramolecular level through specific non-covalent interactional algorithms, thus behaving as programmed chemical systems. Supramolecular chemistry is intrinsically a dynamic chemistry in view of the lability of the interactions connecting the molecular components of a supramolecular entity and the resulting ability of supramolecular species to exchange their components. The same holds for molecular chemistry when the molecular entity contains covalent bonds that may form and break reversibility, so as to allow a continuous change in constitution by reorganization and exchange of building blocks. These features define a Constitutional Dynamic Chemistry (CDC) on both the molecular and supramolecular levels.

CDC introduces a paradigm shift with respect to constitutionally static chemistry. The latter relies on design for the generation of a target entity, whereas CDC takes advantage of dynamic diversity to allow variation and selection. The implementation of selection in chemistry introduces a fundamental change in outlook. Whereas self-organization by design strives to achieve full control over the output molecular or supramolecular entity by explicit programming, self-organization with selection operates on dynamic constitutional diversity in response to either internal or external factors to achieve adaptation.

Applications of this approach in biological systems as well as in materials science will be described. The merging of the features: - information and programmability, - dynamics and structural diversity, -constitution and selection, points to the emergence of adaptive and evolutive chemistry, towards systems of increasing complexity.