



On molecular machines and topology. An overview of the development of the concept of mechanical bond

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If nanomachines lie at the heart of most biological processes, the idea to synthesize artificial molecular machines is relatively new. One of the most important step towards their elaboration was the invention of the concept of mechanical bond in the mid-1980s. Mechanical bonds allow for the components of rotaxanes or catenanes, mechanically locked together but not covalently bond, to move from one position to another in a controlled fashion depending on a given stimulus. As the idea of making molecular machines rapidly became popular, other methods enabling the control of molecular motion appeared, notably with the use of overcrowded alkenes to build rotary molecular motors. The overall importance of these ideas is echoed by the Nobel Prize in chemistry awarded last year to the three pioneers of the field: Jean-Pierre Sauvage, Fraser Stoddart and Ben Feringa. Nowadays, the use of mechanical bonds continues to evolve. Most notably, they can be introduced into architectures more and more complex, such as macrocyclic knots, whose properties are yet to be explored. (Image: I.M.Redesiuk – Fotolia)



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