

Illuminating Motion; from Molecular Switches to Motors

Ben L. Feringa

Stratingh Institute for Chemistry, University of Groningen
Nijenborgh 4, 9747 AG Groningen, The Netherlands
b.l.feringa@rug.nl

The fascinating molecular motors and machines that sustain life offer a great source of inspiration to the molecular and materials explorer at the nanoscale. Among the major challenges ahead in the design of complex artificial molecular systems and smart materials is the control over dynamic properties and responsive far-from-equilibrium behavior. A major goal is to achieve and exploit translational and rotary motion and dynamic organization controlled by light. In this presentation the focus is on the dynamics of functional molecular systems as well as triggering and assembly processes. We design light-powered switches and motors in which molecular motion is coupled to specific functions. Responsive behavior will be illustrated in self-assembly and responsive materials with a focus on cooperative action, artificial muscles, amplification along multiple length scales and 2D and 3D organized systems. The design, synthesis and functioning of rotary molecular motors and machines will be presented with a prospect toward future dynamic molecular systems and smart materials.