

A molecular toolkit based on cyclodextrin polymers for surface materials with switchable tribological functions

Initiative: Integration molekularer Komponenten in funktionale makroskopische Systeme (beendet, nur noch

Fortsetzungsanträge)

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Aim of the project is a molecular toolkit which allows to integrate cyclodextrin-based macromolecules into surface materials with designated tribological functions. Contacting surfaces are functionalized with the same host molecules. The interaction between the surfaces is mediated by a layer of ditopic guest molecules, whose binding characteristics can be switched by external stimuli such as light or electrochemical potential. The modular system can be adapted to various surfaces and applications without redesign of its basic elements. The integration of the molecular building blocks into the macroscopic system allows for the first time implementation of tribological functions at all length scales, which are demonstrated by mechanical multiscale experiments ranging from single molecule force spectroscopy and high-resolution imaging to macroscopic devices. The aqueous basis of the approach opens a wide field of applications in biomedical technology, for example where fasteners are required that operate without application of normal pressure.

Projektbeteiligte

Prof. Dr. Roland Bennewitz

INM - Leibniz-Institut
für Neue Materialien gGmbH
Programmbereich Interaktive Oberflächen
Saarbrücken

Prof. Dr. Gerhard Wenz

Universität des Saarlandes
Lehrstuhl für Organische Makromolekulare Chemie
Saarbrücken

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