



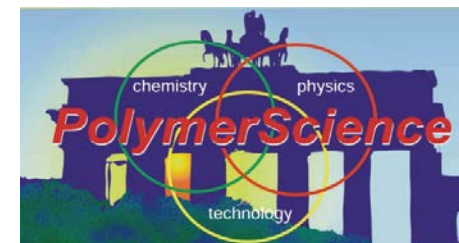
Makromolekulare und Supramolekulare Chemie



www.nanoscale.fu-berlin.de

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Institute of Chemistry and Biochemistry
Department of Biology, Chemistry and Pharmacy



General Challenges for Polymer Chemistry

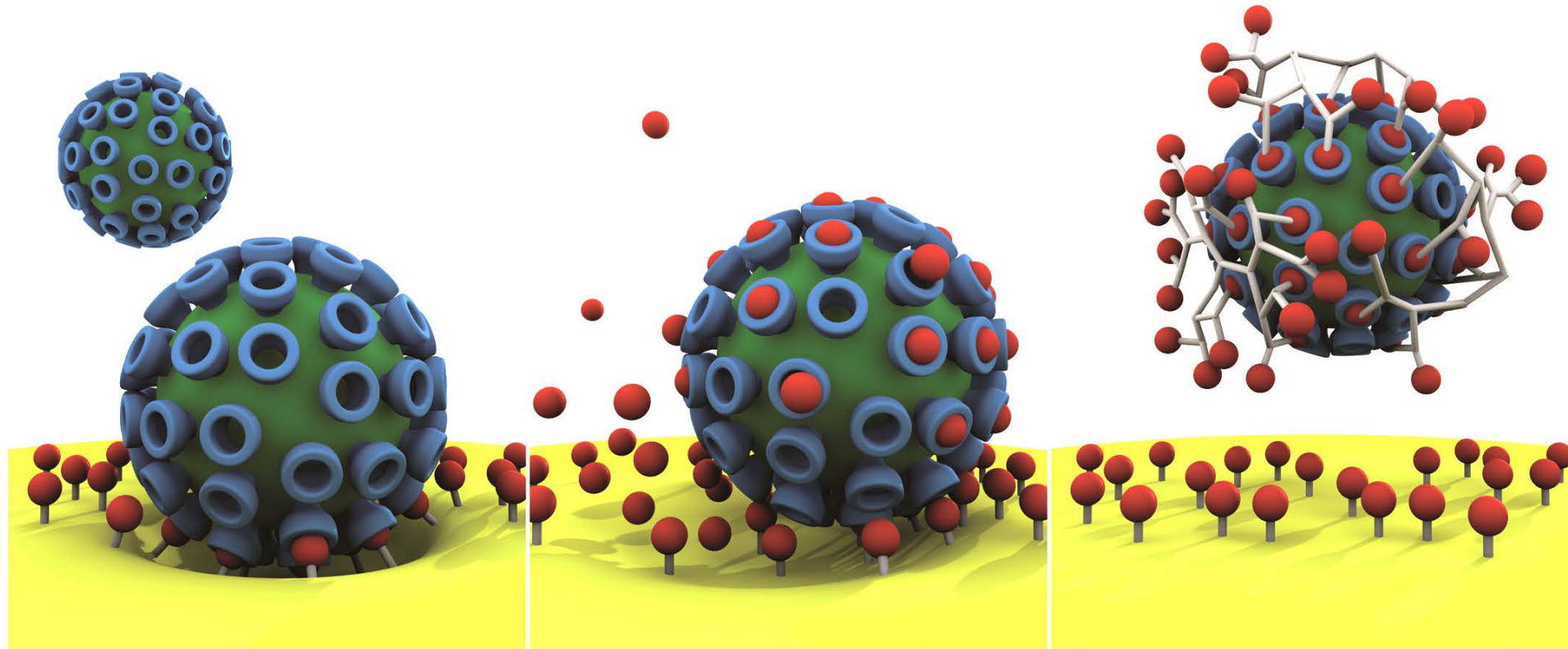
- Precise Control of Heterogeneity and Multiple Functionality
- Simple and Robust Protocols for Complex Architectures
- Self-Replicating/Templating with Error Correction
- Advanced Molecular Recognition and Self-Assembly
- Complex Hybrid Materials

Electronic, Mechanical and Environmental Polymers

- Improved Conjugated Polymers
- Directionally Moving Polymers
- Reduced Environmental Impact

NSF Round Table: T. P. Lodge et al. *Macromolecules* **2009**, *42*, 465.

Pathogen Cell Interactions (Bacteria and Viruses)



Virus-Cell Adhesion

Monovalent and Multivalent Competition

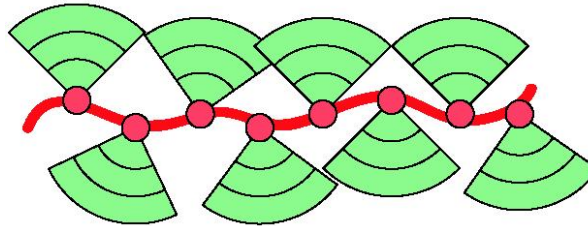
M. Mammen, G. M. Whitesides, et al. *Angew. Chem.* **1998**, *110*, 2908.

C. Fasting, R. Haag, et al. *Angew. Chem.* **2012**, *124*, 10622.

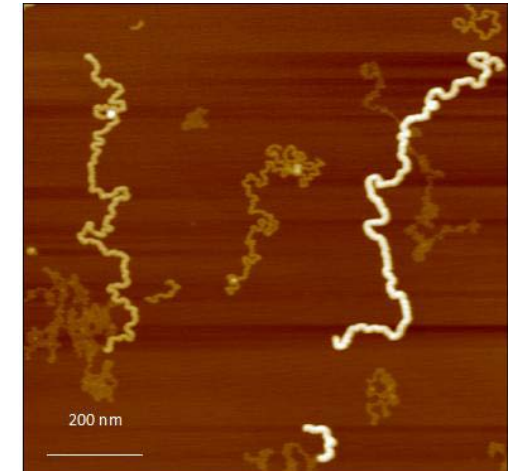
www.sfb765.de

Controlled 1D architectures

- Length
- Flexibility
- Multifunctionality

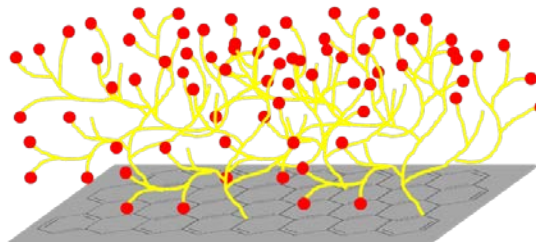


www.tutorgigipedia.com



Asymmetric 2D architectures

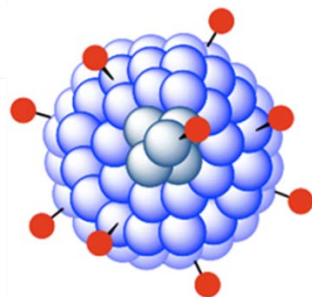
- Stiffness
- Sheet Size
- Side Differentiation



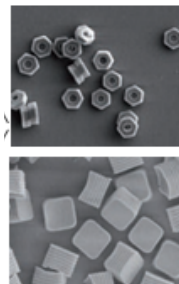
Multifunctional 3D Architectures

- Flexibility and Shape Control

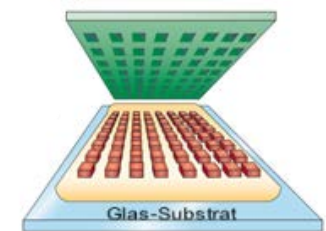
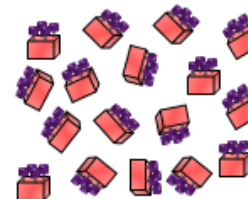
Bottom up



Top down

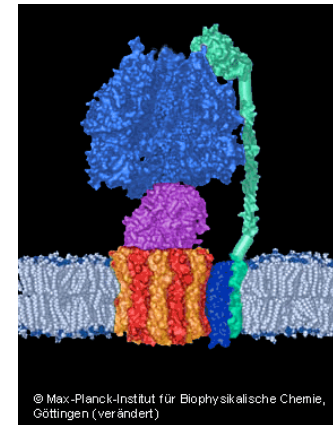


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Biomacromolecules as Models for or Components of Complex Polymers

- Hierarchical Structures
- Multi-Stimuli Responsive Polymers
- Controlled Reversibility of Assembly
- Directing Structure via Controlled Kinetic Pathways
- Complex Systems for the Fabrication of Nanoscale Objects
- Integration of Complex Polymers into Functional Systems



➤ **Macromolecular BioScience**