Anisotropy, multivalency and flexibility-induced effects in colloidal systems

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Stellingen

Behorend bij het proefschrift:

Anisotropy, multivalency and flexibility-induced effects in colloidal systems

I. A preferred particle orientation relative to the wall may alter the diffusive properties of anisotropic particles near surfaces.
Chapter 2 of this thesis.

II. Super-selectivity enables the successful self-assembly of clusters of colloid supported lipid bilayers (CSLBs) of the desired valency.
Chapter 4 of this thesis.

III. In deformable biological macromolecules, the Brownian quasiscallop mode could affect the efficiency of lock-and-key interactions.
Chapter 5 of this thesis.

IV. The flexibility of reconfigurable colloidal structures can be influenced by hydrodynamic interactions between the subunits.
Chapters 5 and 6 of this thesis.

V. The reported broader association/dissociation transition of colloids with mobile DNA linkers compared to fixed ones is partly caused by the large variations in DNA concentrations on colloids with mobile linkers.
S.A.J. van der Meulen and M.E. Leunissen, J. Am. Chem. Soc. ***135****, 15129-15134 (2013).*

VI. Similarly to what was found in a recent system of DNA origami hinges, in CSLBs, the nature of confinement of the linkers in the patch area, which is set by the particle shape, may affect the free energy of the DNA linkers.
Z. Shi and G. Arya, Nucleic Acids Res. ***48****, 2, 548-560 (2020).*

VII. It is surprising that McMullen et al. claim that the flexibility of colloidal chains does not depend on DNA linker concentration; a larger concentration range may have to be sampled to confirm this.
A. McMullen et al., Phys. Rev. Lett. ***121****, 138002 (2018).*
I. Chakraborty et al., Nanoscale ***9****, 7814-7821 (2017).*

VIII. Holographic particle characterization could be used to study the formation of the bilayer and the insertion of DNA linkers in colloid supported lipid bilayers.
L.E. Altman and D.G. Grier, Biomed. Opt. Express ***11****, 5225-5236 (2020).*

IX. Fundamental problems in the natural sciences, such as in soft matter physics, can often lead to applications that are highly relevant to societal issues, such as the current COVID-19 pandemic.
W.C.K. Poon et al., Soft Matter ***16****, 8310-8324 (2020).*

X. Bottom-up behavioral changes of individuals to combat climate change are more effective when supported by strong, top-down governmental policies.

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