Supramolecular Polymers in DNA Nanotechnology

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Creation of biocompatible functional materials is an important task in supramolecular chemistry[1]. In this contribution, we report on noncovalent synthesis of DNA-grafted supramolecular polymers (SPs)[2]. DNA-grafted SPs enable programmed arrangement of oligonucleotides in a regular, tightly packed one-dimensional array. Further interactions of DNA-grafted SPs with complementary DNA strands leads to the formation of networks through highly cooperative G-C blunt-end stacking interactions (Fig. 1C)[3]. The structural changes in the polymeric core enable to monitor spectroscopically the stepwise formation of networks (Fig. 1A). Such stimuli-responsive supramolecular networks may lead to the development of DNA-based smart materials.

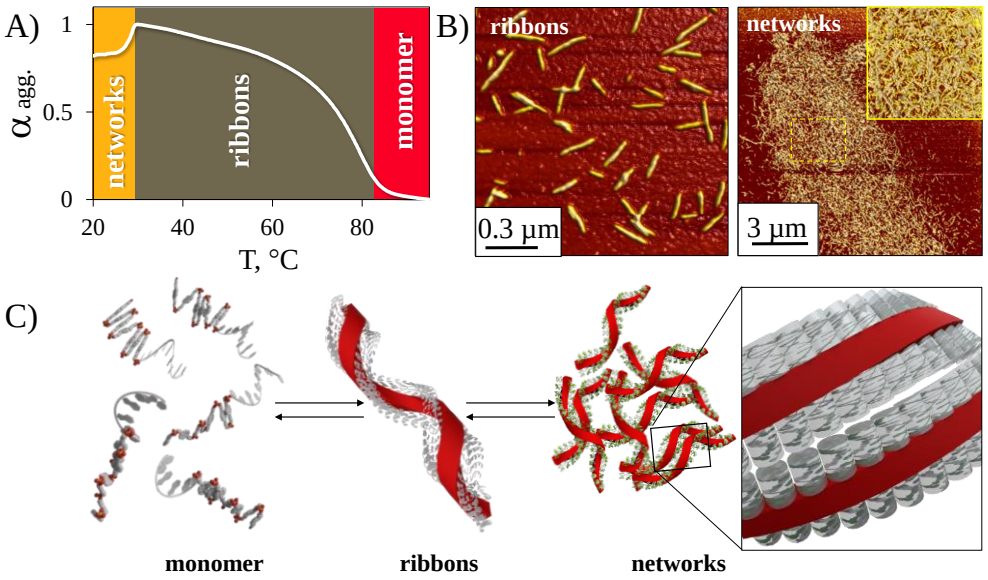

Fig. 1 A) Temperature-dependent degree of aggregation B) AFM images C) Illustrative model of network formation

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(2) Y. Vyborna, M. Vybornyi, A. Rudnev, R. Häner, *Angew. Chem. Int. Ed*., 54, 7934-7938 (2015)
(3) Y. Vyborna, M. Vybornyi, R. Häner, *J. Am. Chem. Soc*., doi: 10.1021/jacs.5b09889 (2015)

Yuliia Vyborna completed her undergraduate studies at the Kyiv National University in Ukraine. In 2014 she moved to the group of Prof. Dr. Robert Häner at the University of Bern (Switzerland) as PhD. Her current research interests focus on noncovalent synthesis and characterization of DNA-based supramolecular polymers and their applications in nanotechnology.