

Multiresponsive Microgel Systems

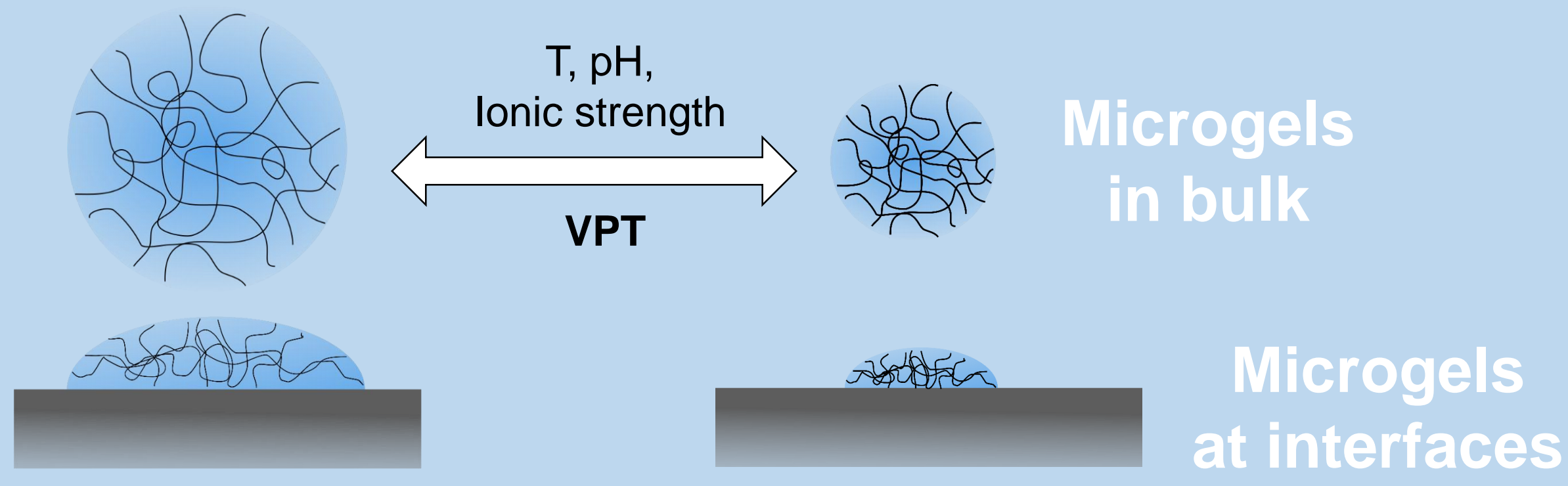


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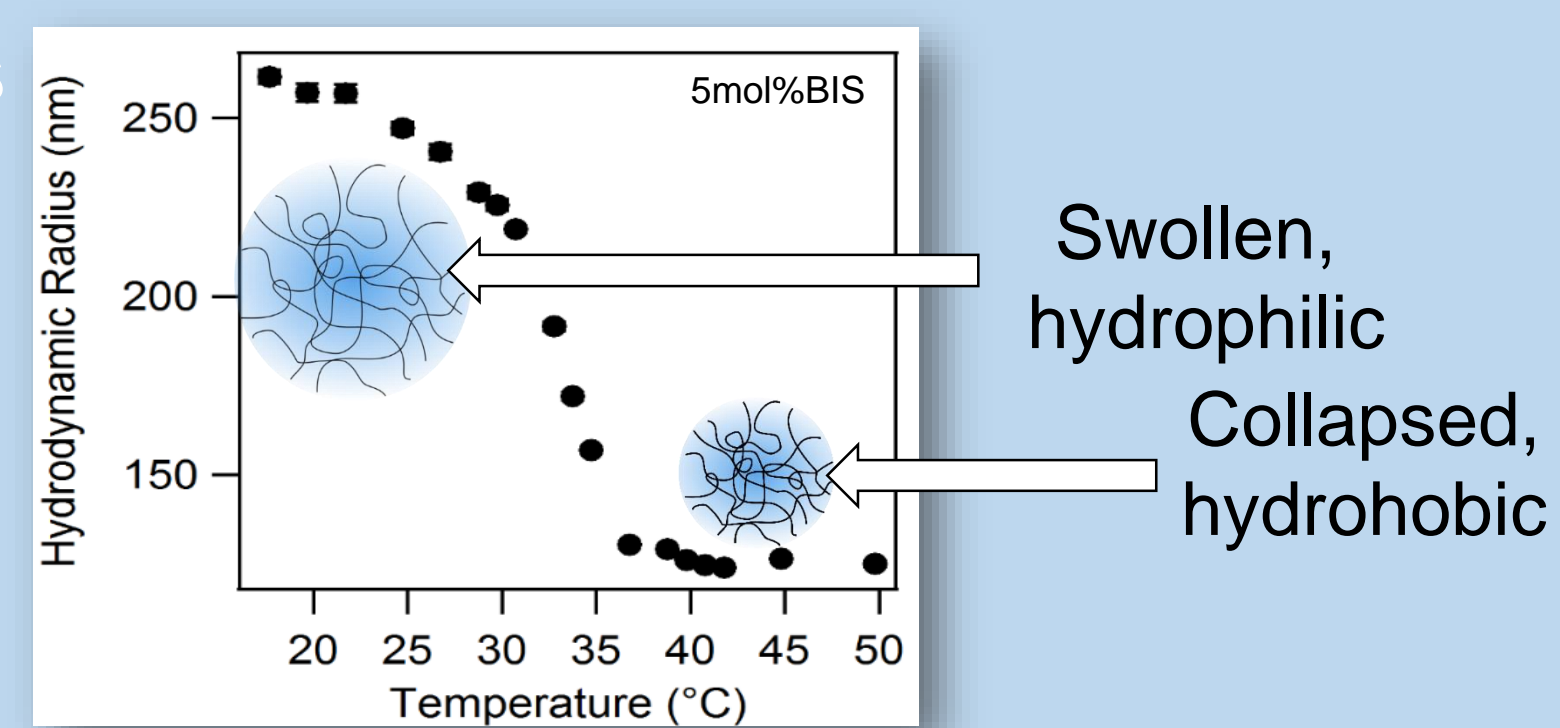
Poly(N-isopropylacrylamide) Microgels



- Colloidal particles with diameter: 100nm - 1µm
- Reversible volume phase transition (VPT) in response to external stimuli as temperature, pH and ionic strength
- Particle formation by radical precipitation polymerization
- Water-soluble microgel, not biocompatible

Temperature as stimulus

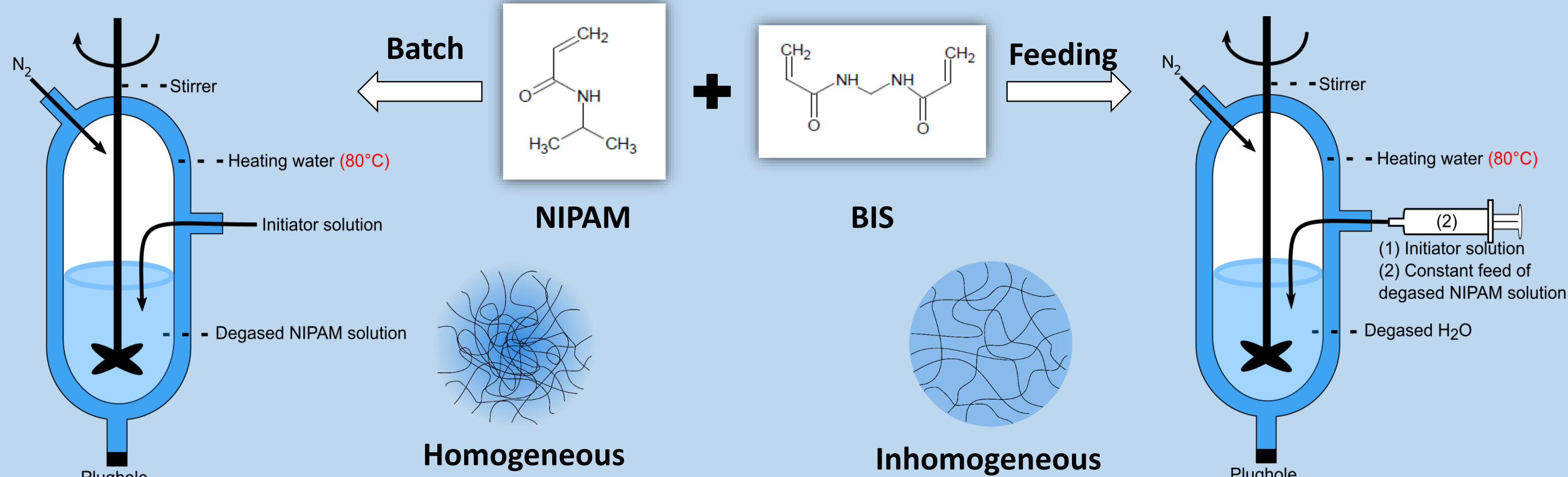
Reversible VPT due to LCST at ~32°C



Charge of microgels due to ...

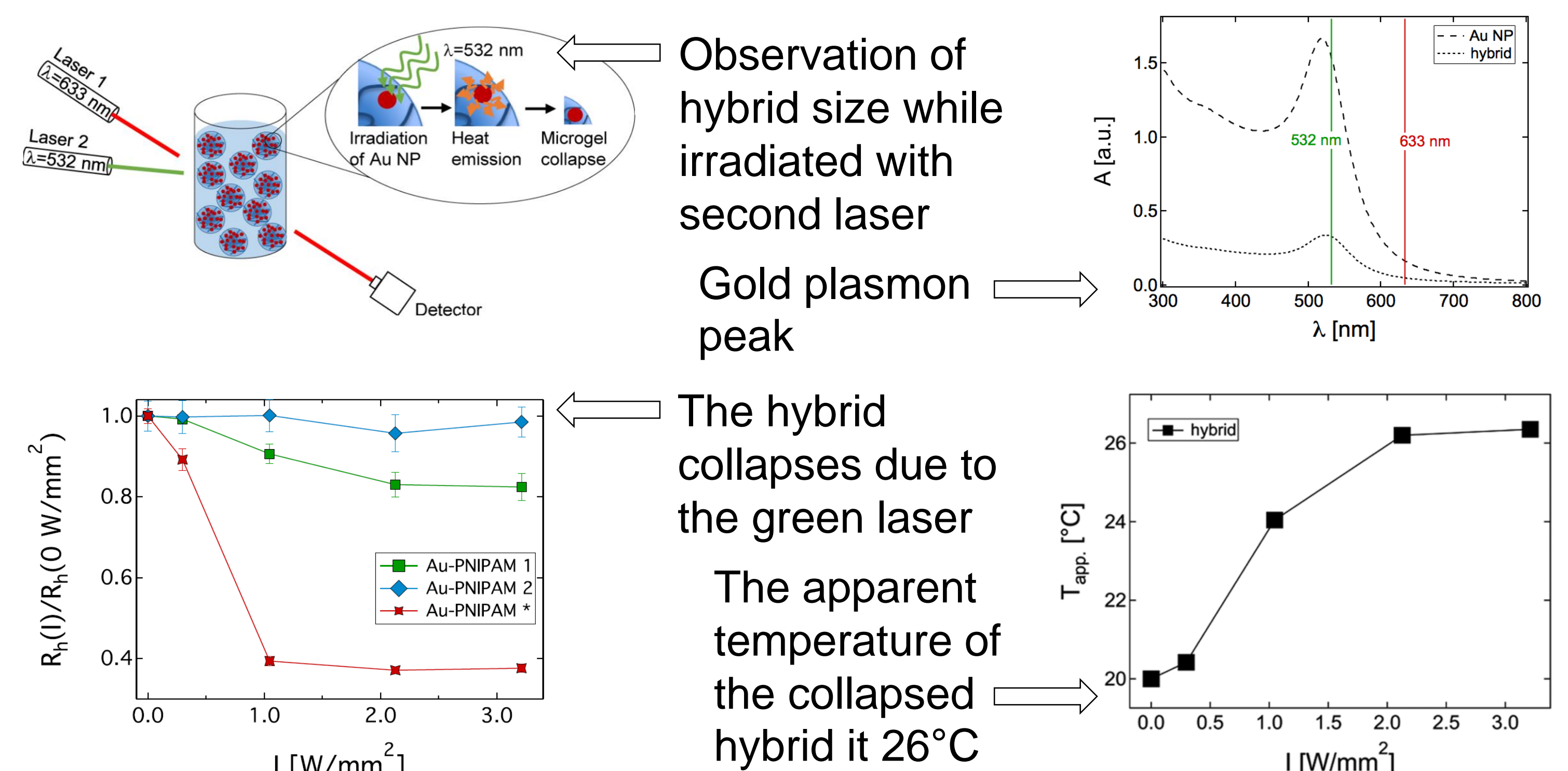
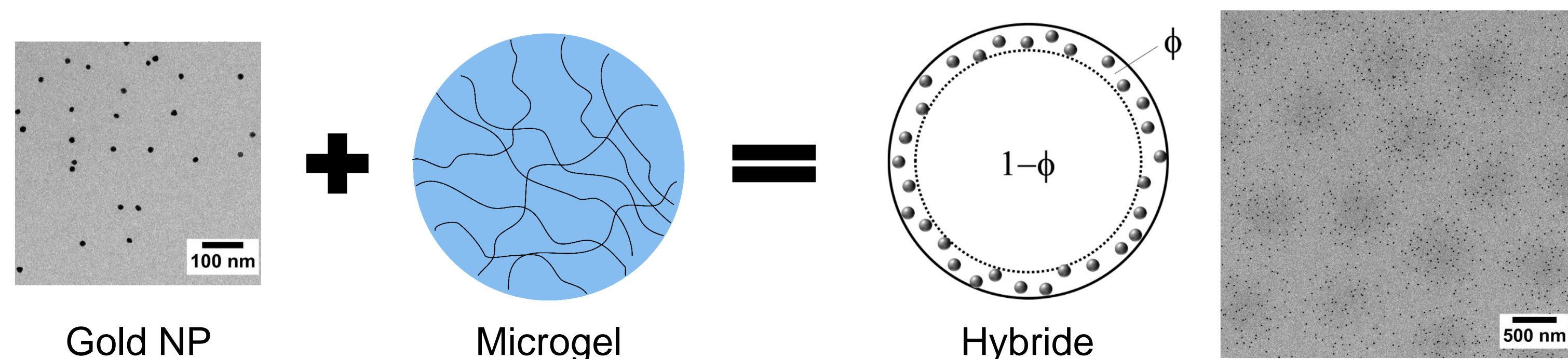
- Functional groups of initiator molecule
- Incorporation of charged comonomers

Internal Structure



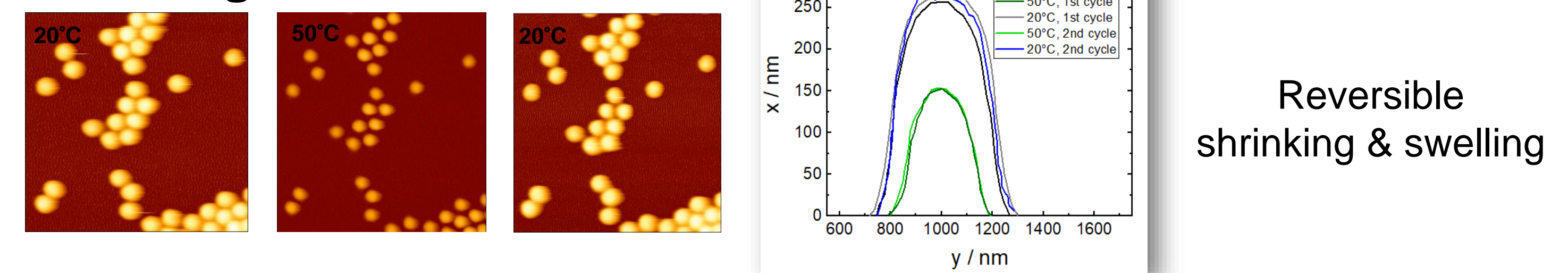
- **Batch synthesis:** inhomogeneous crosslinking due to differing reactivities of monomer (NIPAM) and crosslinker (BIS)
- **Feeding synthesis:** homogeneous crosslinking due to constant feed of NIPAM and BIS

Golden Microgels

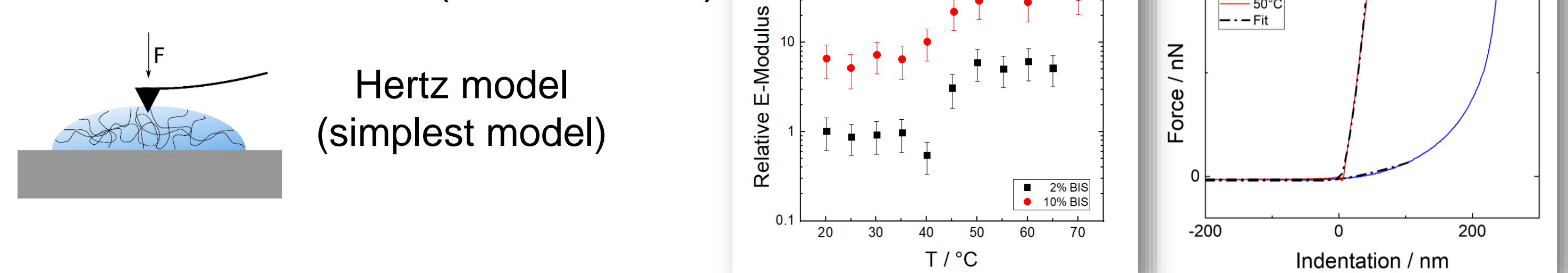


Microgel AFM

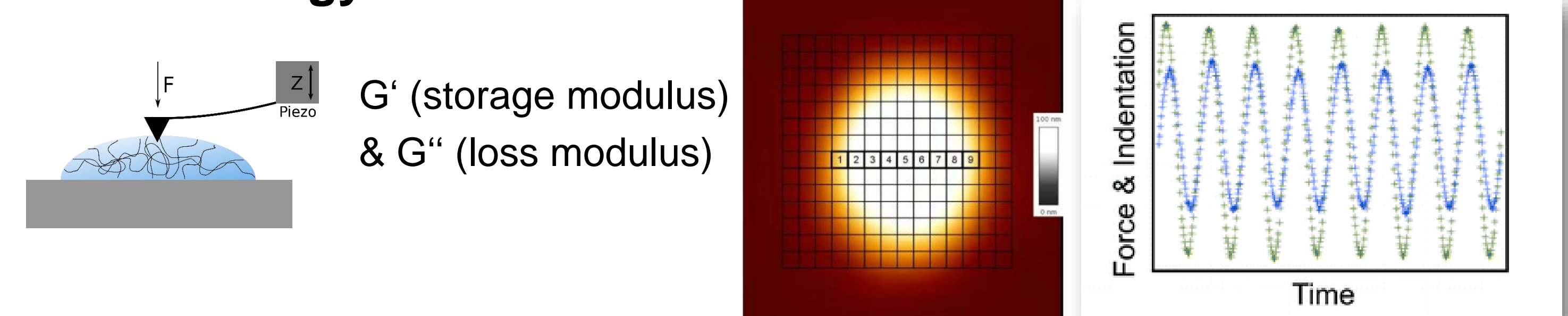
Scanning AFM



Nanomechanics (Indentation)

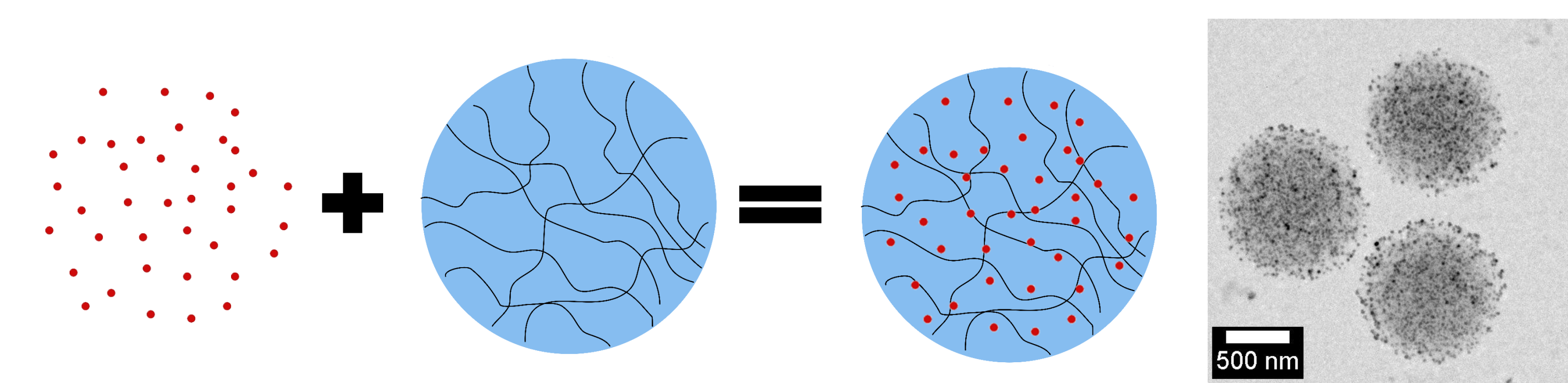


Nanorheology

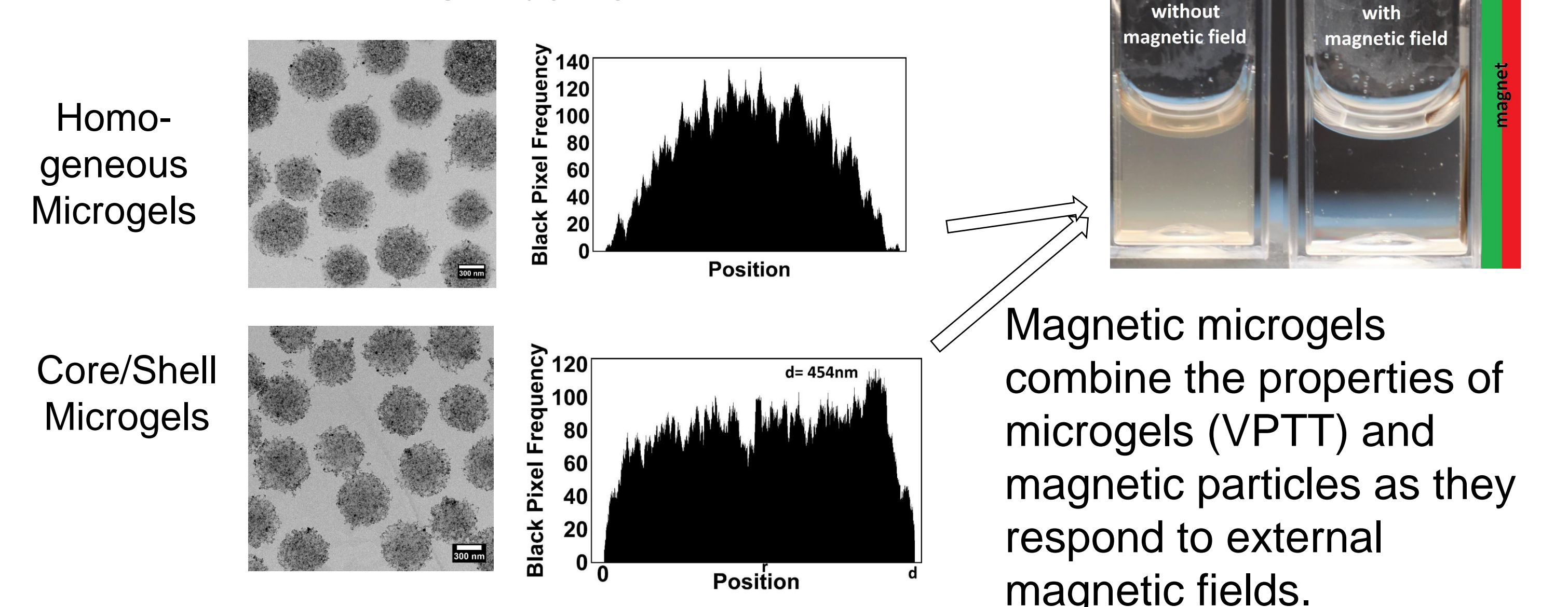


Magnetic Microgels

Contact: Marcus Witt

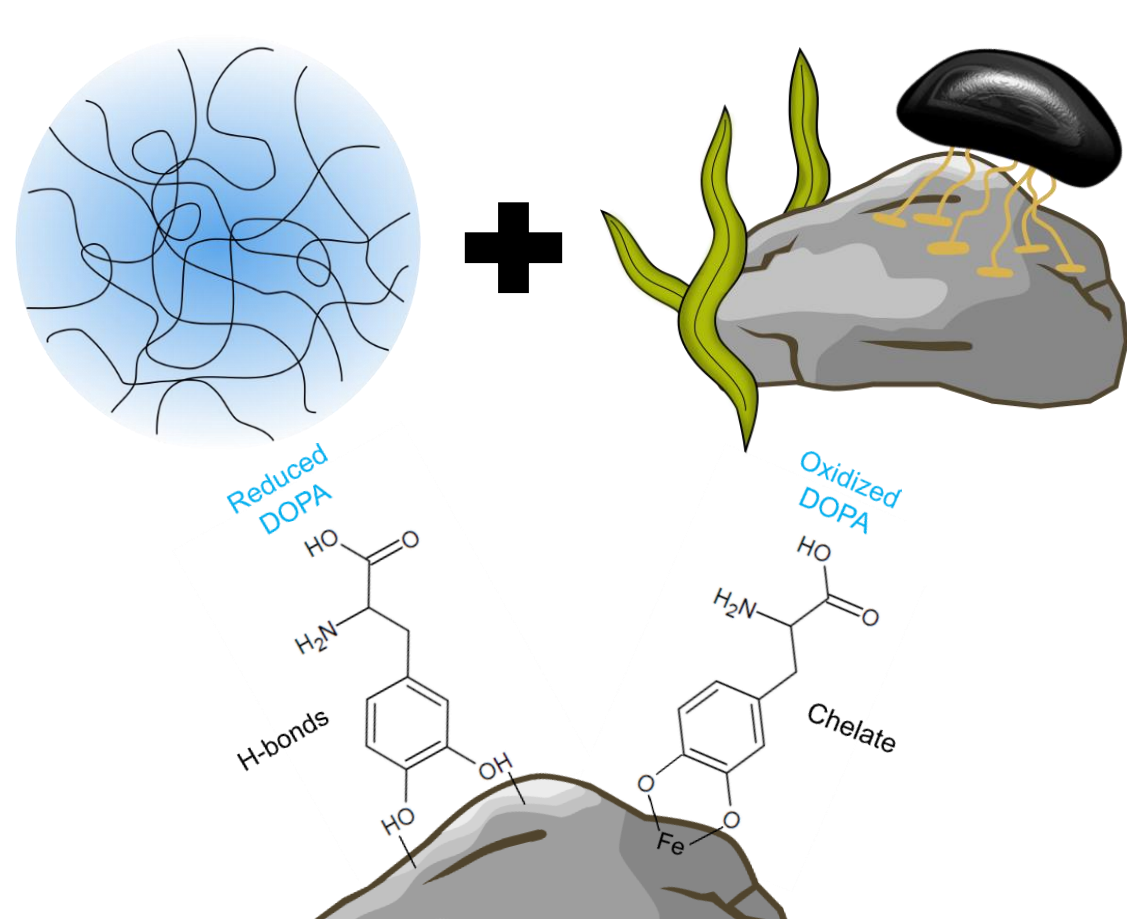


MNP Distribution

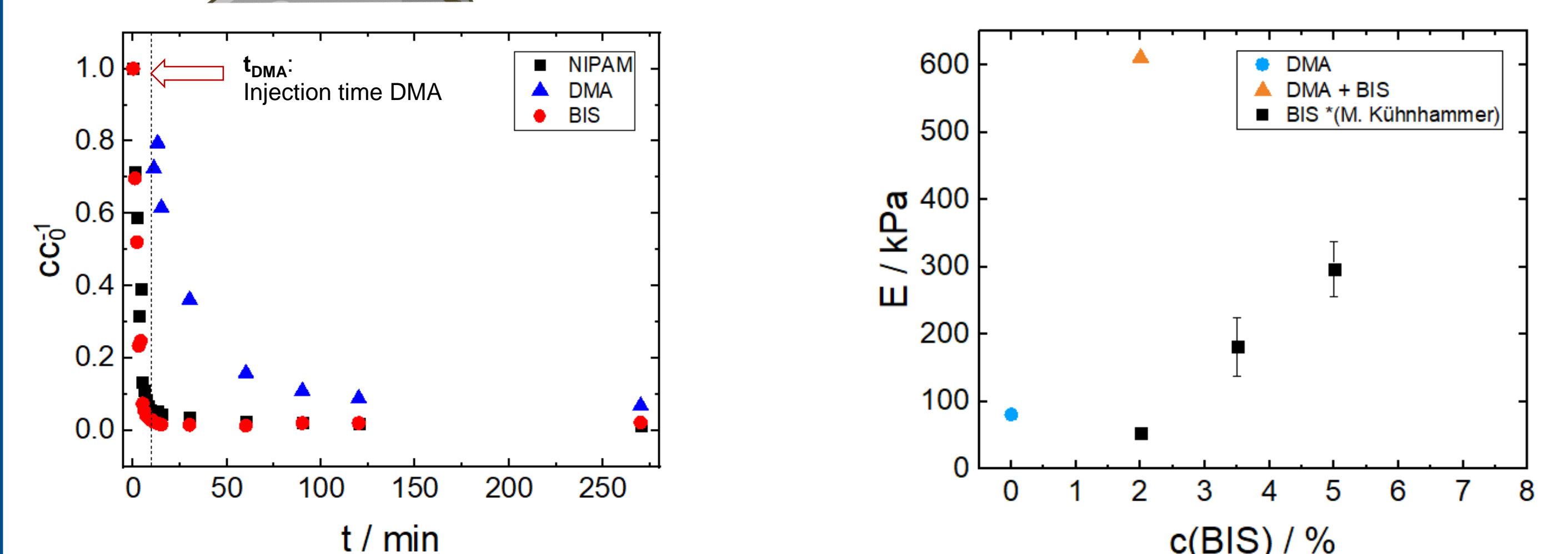


Adhesive Microgels

Contact: Sandra Forg



- Mussels show strong adhesion to other substrates due to protein called DOPA
- DOPA can be incorporated into the microgel structure
- Nanoparticles can be used to enhance the microgels mechanical strength



- Delayed DMA injection during synthesis needed, since DMA acts as „scavenger“
- E-modulus of microgels with DMA + BIS much higher than microgels without DMA („Synergistic effect“)