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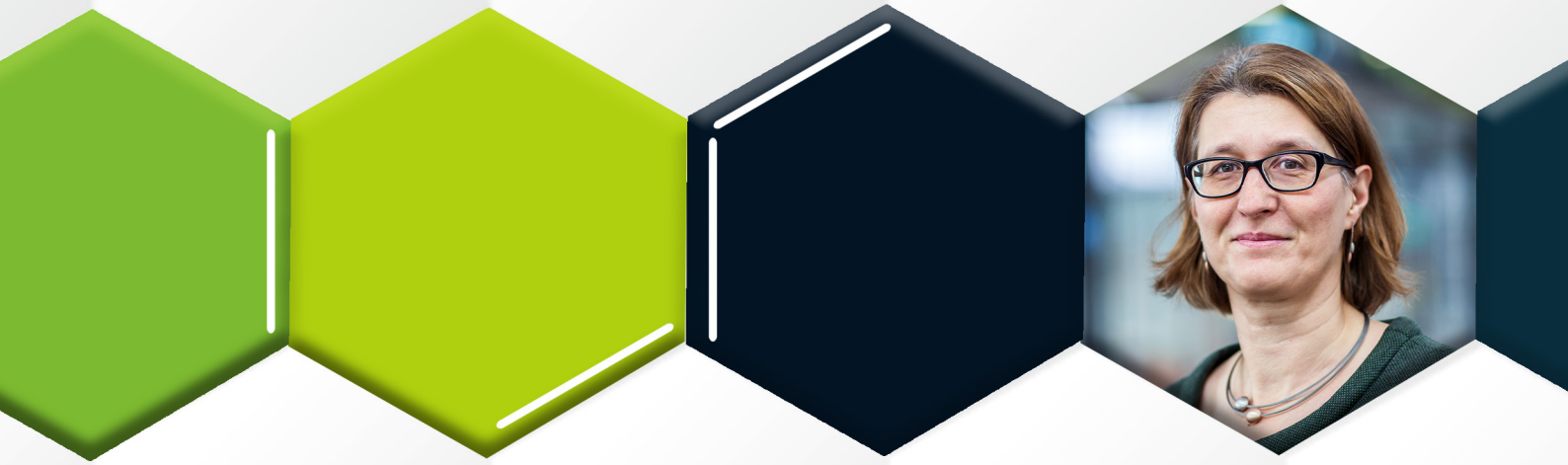
EuroTech Seminar

Folding single polymer chains into catalytically active nanoparticles



12 May 2022

15:00-16:00 CET
Zoom link:
https://dtudk.zoom.us/j/61145894183

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Inspired by protein folding, we investigate the single-chain folding of synthetic polymers using a combination of hydrophobic and hydrogen-bonding interactions into defined 3D structures, with the aim to achieve high activity and selectivity in catalytic reactions. We observe that the balance between hydrophobic, structuring and hydrophilic moieties is crucial to obtain compact, stably folded polymer conformations of nanometer-size and to prevent interparticle interactions. In this lecture, I show that the hydrophobic interior within polymeric nanoparticles allows to entrap transition-metal-based and organo-based catalysts. In addition, hydrophobic substrates are sequestered from the aqueous environment and accumulate in the nanoparticle's interior. This permits a range of catalytic reactions to be accomplished in mild aqueous conditions, and even in complex media. All in all, polymeric nanoparticles provide a stable, compartmentalized environment for achieving efficient catalysis by high local concentrations of both substrate and catalysts.