



Janus Discs

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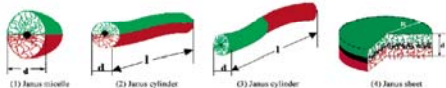
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Introduction

AIM

- Synthesis of novel sheet-like Janus structures via a triblock terpolymer template
- Investigation of the solution properties
- Study of the interfacial properties and the stabilizing efficiency for emulsions



Synthetic Strategy

4 Step procedure

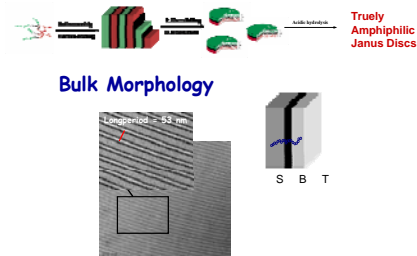
Sequential anionic polymerization of Polystyrene-*block*-Polybutadiene-*block*-Poly(methyl methacrylate) (SBT) triblock copolymers with suitable composition for the lamellar (II) morphology

Crosslinking of the inner polybutadiene layer of the bulk morphology of the SBT terpolymers and subsequent Soxhlet extraction

Sonication of the insoluble material until a semiturbid solution is reached

Acidic hydrolysis of the *tert*-butyl groups and step-wise dialysis from dioxane into water

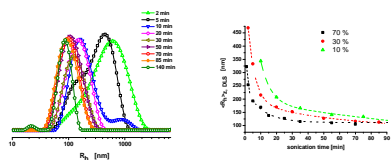
Templated Synthesis of Janus Structures via Microphase separated Triblock Copolymers



Solution properties and Imaging

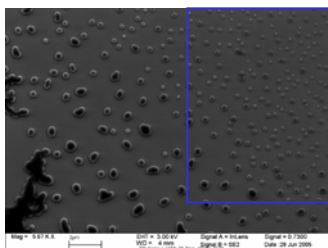
Particle size distribution

Dynamic Light Scattering



- Exponential decay of particle size with sonication time
- More rapid decrease for higher sonication amplitudes
- Hydrodynamic radii can be tuned via two ways

Scanning Electron Microscopy

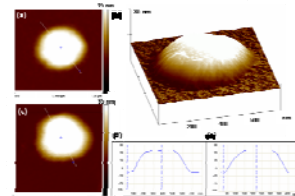
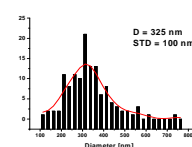


Circular flat particles with strong aggregation tendency

Scanning Force Microscopy

Single particle analysis

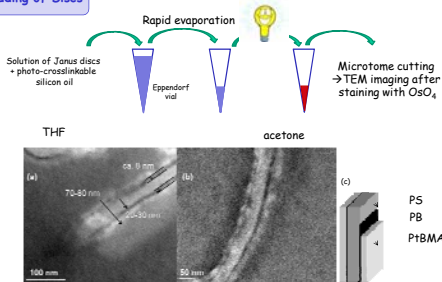
Size distribution of non-aggregated particles



Flat particles with high aspect ratio

Multicompartment Character

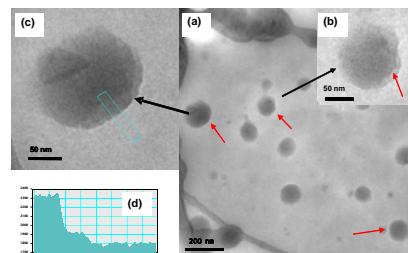
Embedding of Discs



Back-to-back stacked superstructures with internal compartmentalization

Self-Assembly

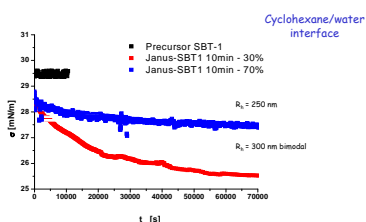
Cryo-TEM in THF



- Cryo-TEM in THF shows layered structures, demonstrating back-to-back stacking of the particles
- Fascinating and unexpected aggregation patterns even in good organic solvents

Surface activity

Pendant drop method



- Significant decrease of the interfacial tension for the sheet-like Janus structures
- Size dependence
- Highly surface-active novel class of materials

Conclusion

- Successful synthesis of novel disc-like Janus particles
- Size of the particles can be tuned both by sonication duration and intensity
- Non-hydrolyzed Janus structures show superstructures in good organic solvents
- Multicompartment structure can be shown with TEM
- Size-dependent decrease of the oil/water interfacial tension

Acknowledgments

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