

CBC SEMINAR ANNOUNCEMENT



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Clean Processes of Polymerization: Organocatalysis, Photopolymerization, Biobased Monomers, Supercritical Carbon Dioxide, Water

Pursuing efforts for the sustainable production of polymers, we have explored various methodologies to avoid the use of metal catalysts, petroleum-based reactants and organic solvents (volatile organic compounds VOCs).

Photolatent polymerization opens the way for applications where a delayed reaction and/or a spatial control is required. The polymerization begins "on demand" when and where the irradiation is applied.[1-2] We will present photobase generators (PBGs) releasing either triazabicyclodecene (TBD) [3] or N-heterocyclic carbenes (NHC) as **organocatalysts**. Advantages and limitations of the two systems in terms of robustness and level of control in the ring-opening **photopolymerization** of monomers such as L-lactide will be highlighted.

Besides, we will present the synthesis of **star-shaped polymers** based on epsilon-caprolactone by ring-opening polymerization according to a core-first approach. To this aim, we have chosen to combine the utilization of a **renewable initiator** (D-sorbitol), a clean solvent (**supercritical CO₂**), and an **enzyme** as catalyst (*Candida antarctica* lipase B). [4] In addition, amphiphilic star block copolymers were targeted for applications in aqueous media.

Finally, we will present some results on **aqueous radical emulsion polymerization** of **biobased monomers**, starting from biosourced aromatic building blocks such as cardanol and eugenol. [5-6]

References:

- [1] Chem. Eur. J. 2018, 24, 337-341. <http://dx.doi.org/10.1002/chem.201705145>
- [2] Polymer Chemistry 2018, 9, 5481-5498. <http://dx.doi.org/10.1039/C8PY01011K>
- [3] ACS MacroLetters 2018, 7, 688-692. <http://dx.doi.org/10.1021/acsmacrolett.8b00251>
- [4] Polymer Chemistry 2018, 9, 5594-5607. <http://dx.doi.org/10.1039/c8py01266k>
- [5] Polymer Chemistry 2018, 9, 2468-2477. <http://dx.doi.org/10.1039/c8py00167g>
- [6] Green Chemistry 2019, Tutorial Review, 21, 36-53. <http://dx.doi.org/10.1039/C8GC02277A>

Date: 28th June 2019 (Friday)
Time: 10.30 am to 11.30am
Venue: SPMS Research & Graduate
Studies Office Conference Room
Host: Associate Professor GOTO Atsushi