Preparation and Charaterization of Well-defined Thermoresponsive Polymer Surfactants

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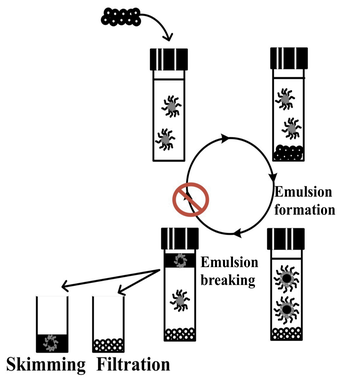
Introduction

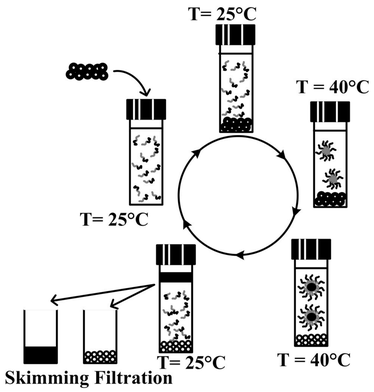
Polymeric surfactants are among the most important additives that are used in the extraction of oil from oil sands. However, a fraction of these surfactants can enter the oil phase and are difficult to recover. The use of stimuli-responsive surfactants is one approach around this problem. This research intends to study the efficiency of temperature-responsive polymeric surfactants poly(ethylene glycol)-block-poly(N-isopropylacrylamide) at stabilizing oil-in-water emulsions.

Applications in the Oil Extraction

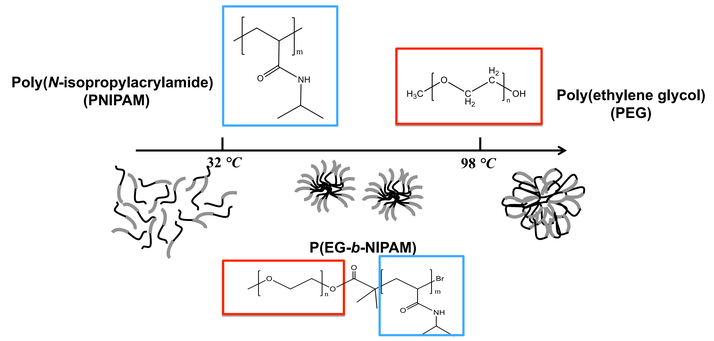
- Traditional oil-extraction surfactants



- Thermoresponsive polymer surfactants

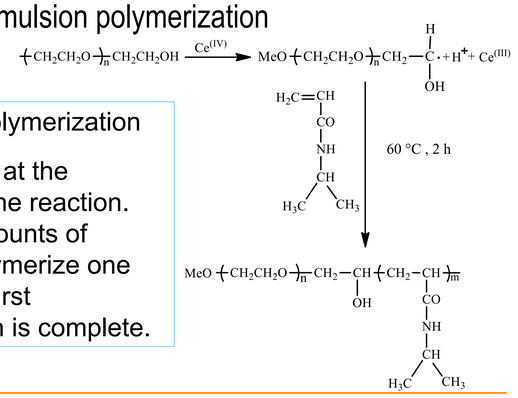


Thermoresponsive Polymer Surfactant PEG-*b*-PNIPAm



Synthesis of PEG-*b*-PNIPAm

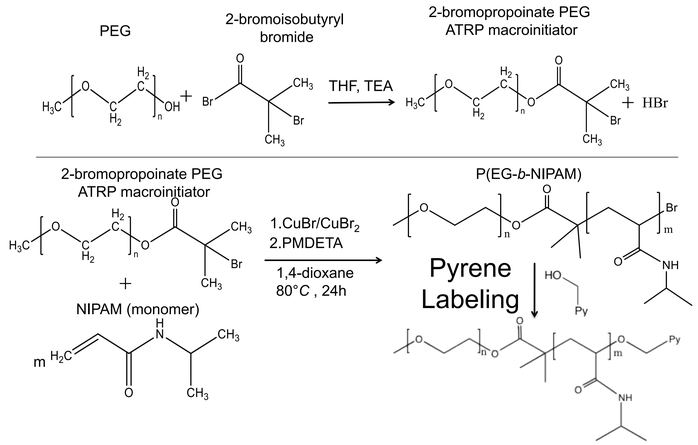
- Soap-free emulsion polymerization



Quasi-living polymerization

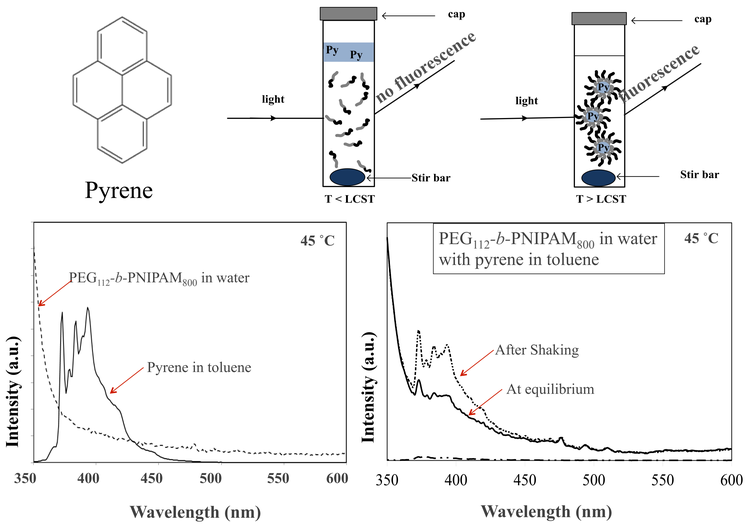
- Radicals from at the beginning of the reaction.
- Additional amounts of monomer polymerize one day after the first polymerization is complete.

- Atom transfer radical polymerization (ATRP)

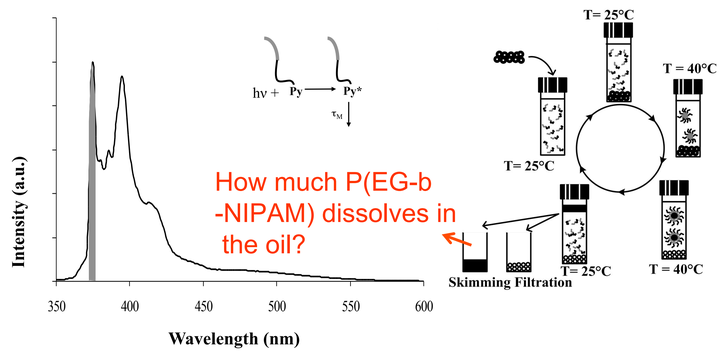


Characterization of PEG-*b*-PNIPAm

Emulsion Stability



Recovery Efficiency



References

- Topp, M. D. D.; Dijkstra, P. J.; Talsma, H.; Feijen, J. *Macromolecules* **1997**, *30*, 8518-8520.
- Hong, J.; Wang, Q.; Lin, Y. Z.; Fan, Z. Q. *Macromolecules* **2005**, 38, 2691.

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