

Cleveland State University

EngagedScholarship@CSU

Undergraduate Research Posters 2015

Undergraduate Research Posters


2015

Synthesis of optimal polymeric microgels and their characterization with light scattering

Christan Gunder
Cleveland State University

Daria Kulyk
Cleveland State University

Follow this and additional works at: https://engagedscholarship.csuohio.edu/u_poster_2015

 Part of the [Life Sciences Commons](#), [Medicine and Health Sciences Commons](#), and the [Physical Sciences and Mathematics Commons](#)

[How does access to this work benefit you? Let us know!](#)

Recommended Citation

Gunder, Christan and Kulyk, Daria, "Synthesis of optimal polymeric microgels and their characterization with light scattering" (2015). *Undergraduate Research Posters 2015*. 32.

https://engagedscholarship.csuohio.edu/u_poster_2015/32

This Book is brought to you for free and open access by the Undergraduate Research Posters at EngagedScholarship@CSU. It has been accepted for inclusion in Undergraduate Research Posters 2015 by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.



Synthesis of optimal polymeric microgels and their characterization with light scattering

College of Sciences and Health Professions

Student Researchers: Christan Gunder and Daria Kulyk

Faculty Advisors: Kiril A Streletsky and Petru Fodor

Abstract

Polymeric microgels were synthesized by chemically crosslinking hydroxypropylcellulose (HPC) chains with each other in aqueous solutions of sodium hydroxide at temperatures above the low solution critical temperature (LCST) of HPC. In order to create a narrower size distribution of HPC microgels, surfactant (dodecyltrimethylammonium bromide, DTAB) was added. It was found that, LCST of the solution moved from ~40C up to 80C with an increase in DTAB concentration from 0 to 12 g/l. Formed microgels were characterized by dynamic light scattering (DLS). Microgel solutions synthesized so far resulted in reasonably monodispersed nanoparticles between the sizes of 150-90 nm below the known LCST for HPC, and 90-50 nm above the known LCST for HPC. Surprisingly some of the microgels revealed weak VH signal, indicating their potential geometric anisotropy. Further studies were done in an attempt to explore the effect of synthesis temperature and crosslinker concentration and microgel size, polydispersity, and swelling ratio. It was found that maintaining a pH of 12 for the aqueous sodium hydroxide solvent was critical to ensure reproducibility of synthesis. However, it was also found that the pH of the solvent had no effect on the overall LCST of the HPC in DTAB-free solutions.