

Abstract Submitted
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Synthesis of Poly(N-isopropylacrylamide) Microcapsules for Drug Delivery Applications via UV Aerosol Photopolymerization.¹

NICOLE ROBERSON, DANIEL DENMARK, SARATH WITANACHCHI , University of South Florida — Hybrid drug delivery systems composed of thermoresponsive polymers and magnetic nanoparticles have been developed using chemical methods to deliver controlled amounts of a biotherapeutic to target tissue. These methods can be expensive, time intensive, and produce impure composites due to the use of surfactants during polymer synthesis. In this study, UV aerosol photopolymerization is used to synthesize N-isopropylacrylamide (NIPAM) monomers, N,N-methylenebisacrylamide (MBA) crosslinker, and irgacure 2959 photoinitiator into the transporting microcapsule for drug delivery. The method of UV aerosol photopolymerization allows for the continuous, cost effective, and time efficient synthesis of a high concentration of pure polymers in a short amount of time; toxic surfactants are not necessary. Optimal NIPAM monomer, MBA crosslinker, and irgacure 2959 photoinitiator concentrations were tested and analyzed to synthesize a microcapsule with optimal conditions for controlled drug delivery. Scanning Electron Microscope (SEM) imaging reveals that synthesis of polymer microcapsules of about 30 micrometers in size is effective through UV aerosol photopolymerization. Findings will contribute greatly to the field of emergency medicine.

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