

Accepted Manuscript

Macromolecular Nanotechnology

Nanoprecipitation – miniemulsion polymerization combined method: a novel approach to synthesis drug loaded nanoparticles with tunable characteristics

H. Salmani, A.Y. Bilibin

PII: S0014-3057(16)30639-5
DOI: <http://dx.doi.org/10.1016/j.eurpolymj.2016.10.007>
Reference: EPJ 7544

To appear in: *European Polymer Journal*

Received Date: 25 June 2016
Revised Date: 30 September 2016
Accepted Date: 4 October 2016

Please cite this article as: Salmani, H., Bilibin, A.Y., Nanoprecipitation – miniemulsion polymerization combined method: a novel approach to synthesis drug loaded nanoparticles with tunable characteristics, *European Polymer Journal* (2016), doi: <http://dx.doi.org/10.1016/j.eurpolymj.2016.10.007>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Nanoprecipitation – miniemulsion polymerization combined method: a novel approach to synthesis drug loaded nanoparticles with tunable characteristics

H. Salmani¹, A.Y. Bilibin¹

¹St.-Petersburg State University, Institute of Chemistry, 7/9 Universitetskaya nab, St.-Petersburg,
Russia, 199034
hh_salmani@yahoo.com

Abstract

In this research polystyrene nanoparticles (NPs) were synthesized using a novel straightforward approach based on the nanoprecipitation and miniemulsion polymerization. Nanoprecipitation or solvent shifting method was applied to prepare primary emulsions. For this purpose, oil phase consisting of solution of styrene, alcohol and polylactide oligomer as a cosurfactant, was added to aqueous phase consisting of water and surfactant. Primary emulsions were easily formed as a result of water-alcohol interdiffusion. Afterwards polystyrene NPs were synthesized by free radical miniemulsion polymerization process. Effect of variety of parameters, such as initiator nature (water-soluble or oil-soluble), cosurfactant, styrene to alcohol and alcohol to water ratio, on polymerization yield and NPs characteristics were investigated. Sodium 11-acryloyl-aminoundecanoate was tested as an amphiphilic polymerizable surfactant to synthesize polystyrene NPs with surface functional groups. Moreover, to examine the applicability of proposed approach for drug immobilization, rifampicin as a hydrophobic anti tubercular model drug was investigated. NPs characteristics were analyzed using scanning electron microscopy, light scattering and zeta potential measurements. Consequently, it was shown that nanoprecipitation – miniemulsion polymerization approach can be considered as a straightforward, low energy emulsification method to synthesize polymeric NPs with tunable characteristics.

Keywords: styrene, nanoprecipitation, miniemulsion polymerization, drug loading

Download English Version:

<https://daneshyari.com/en/article/5159711>

Download Persian Version:

<https://daneshyari.com/article/5159711>

[Daneshyari.com](https://daneshyari.com)