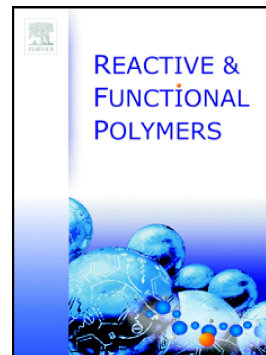


Accepted Manuscript

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PII: S1381-5148(17)30011-1
DOI: doi: [10.1016/j.reactfunctpolym.2017.01.005](https://doi.org/10.1016/j.reactfunctpolym.2017.01.005)
Reference: REACT 3795
To appear in: *Reactive and Functional Polymers*
Received date: 10 November 2016
Revised date: 3 January 2017
Accepted date: 13 January 2017

Please cite this article as: Weiwei Yang, Robin A. Hutchinson , The influence of adding functionality to dispersant and particle core compositions in non-aqueous dispersion polymerization. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. *React*(2017), doi: [10.1016/j.reactfunctpolym.2017.01.005](https://doi.org/10.1016/j.reactfunctpolym.2017.01.005)

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The Influence of Adding Functionality to Dispersant and Particle Core Compositions in Non-Aqueous Dispersion Polymerization

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Abstract

Nano-sized polyacrylate colloids (< 200 nm) at high solids level (~ 60 wt%) are prepared via non-aqueous dispersion (NAD) semibatch polymerization using *n*-butyl methacrylate (BMA)-based macromer dispersants of varying chain lengths and levels of functionality provided by incorporation of 2-hydroxyethyl methacrylate (HEMA) comonomer. The effect of building the complexity of the core polymer recipe from methyl acrylate homopolymer to a five-monomer composition is systematically studied. While average particle size increased with the introduction of functional comonomers, the resulting NAD systems remained stable for all core compositions using both BMA macromers and a copolymer macromer containing 5 mol% HEMA. However, introduction of the HEMA functionality to the dispersant at levels of > 5 mol% led to destabilization of the dispersion. The polarity differences between the core compositions and dispersant polymers and the mixed continuous medium, as represented by Hansen solubility parameters, are qualitatively used to interpret the nucleation of particles and the effectiveness of the dispersants.

Keywords

Macromer dispersant; Hydroxyl functionality; Non-aqueous dispersion; Functionalized copolymers; Solubility parameters

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