

Accepted Manuscript

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PII: S0014-3057(17)32195-X

DOI: <https://doi.org/10.1016/j.eurpolymj.2018.02.026>

Reference: EPJ 8300

To appear in: *European Polymer Journal*

Received Date: 11 December 2017

Revised Date: 8 February 2018

Accepted Date: 18 February 2018

Please cite this article as: Jiménez-Pardo, I., Sun, P., van Benthem, R.A.T.M., Esteves, A.C.C., Design of self-dispersible charged-polymer building blocks for waterborne polyurethane dispersions, *European Polymer Journal* (2018), doi: <https://doi.org/10.1016/j.eurpolymj.2018.02.026>

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Design of self-dispersible charged-polymer building blocks for waterborne polyurethane dispersions

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KEYWORDS. Polycaprolactone, DMPA, waterborne, polyurethane dispersions

ABSTRACT

Waterborne polyurethane dispersions (PUDs) currently have a wide spectrum of applications as coating resins for biomedical products, food packaging, cosmetics and traditional coatings. At present, PUDs are commonly prepared by the “prepolymer extension” method in which isocyanate terminated self-dispersing prepolymers are dispersed in water, followed by chain extension via the terminal isocyanate groups. The preparation of such self-dispersing prepolymers from diisocyanates, ionizable diols and non-ionizable diol blocks is a stochastic process with poor control over the prepolymer molecular weight and functionality distribution, which may result in sub-optimal properties of the PUDs.

We investigated a new route in which we prepare ionizable macro-diol blocks, out of hydrophobic polycaprolactone (PCL) blocks, covalently bonded to the ionizable diol

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