

Synlett 2014

Microfluidic Mixing of Polyamine with Acrolein Enables the Detection of the [4+4] Polymerization of Intermediary Unsaturated Imines: The Properties of a Cytotoxic 1,5-Diazacyclooctane Hydrogel

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Abstract

The [4+4] polymerization of an unsaturated imine, generated from the condensation of a polyamine and excess acrolein, was investigated. The polyamine was added by micropipet to acrolein, immediately yielding a mixture of the immiscible polymeric material. Microfluidic mixing was used to gradually form the soluble diazacyclooctane polymers. The polymerization reaction ultimately gave an insoluble cationic hydrogel that adhered strongly to anionic compounds on cell surfaces, including sialoglycan, and displayed a high cytotoxicity. © Georg Thieme Verlag.

<http://dx.doi.org/10.1055/s-0034-1378634>

Keywords

1,5-diazacyclooctane, [4+4] polymerization, acrolein, cytotoxicity, hydrogel, microreactor, polyamine, sialoglycan