

Zwitterionic cellulose carbamate with regioselective substitution pattern: a coating material possessing antimicrobial activity

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Abstract

A polyzwitterion is synthesized by regioselective functionalization of cellulose possessing a uniform charge distribution. The positively charged ammonium group is present at position 6, while the negative charge of carboxylate is located at positions 2 and 3 of the repeating unit. The molecular structure of the biopolymer derivative is proved by NMR spectroscopy. This cellulose-based zwitterion is applied to several support materials by spin-coating and characterized by means of atomic force microscope, contact angle measurements, ellipsometry, and X-ray photoelectron spectroscopy. The coatings possess antimicrobial activity depending on the support materials (glass, titanium, tissue culture poly(styrene)) as revealed by confocal laser scanning microscopy and live/dead staining.

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