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RADICAL POLYMERIZATION OF 2-(*N*,*N*-DIALLYL-*N*-METHYL-AMMONIO)ACETATE INITIATED BY ATOM TRANSFER

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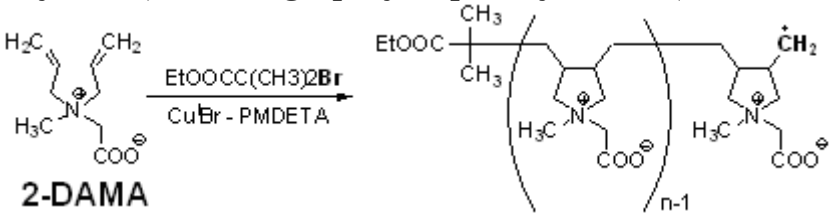
Owing to a high hydration and electro neutrality, zwitterionic compounds are good candidates for preparation of antifouling surfaces. Radical polymerization of zwitterionic monomer 2-(*N*,*N*-diallyl-*N*-methyl-ammonio)acetate (2-DAMA) in solution and on gold surface has been studied in this work. Initiating radicals were generated at ambient temperature by means of abstraction of bromine atom from esters of 2-bromo-2-methylpropionic acid by Cu^{I}-complex [Cu^{I}(PMDETA)Br].

Polymerization of 2-DAMA in solution with 2-bromo-2-methylpropanoate as initiator resulted in the formation of low molecular weight polymers (MW 2000-4000 by GPC) with high polydispersity index (PDI 1.75-1.85).



Molecular weights of polymer fragments found in MALDI-TOF mass spectrum) indicated that polymer chains were terminated by disproportionation and combination. No signals of bromine-containing species were found in the spectrum. Together with broad polydispersity, these observations confirmed conventional pathway of radical polymerization. Lack of bromine-end functionality might be advantageous for antifouling properties.

A self-assembled monolayer of 11-mercaptoundecanoyl 2-bromo-2-methylpropionate attached to gold surface was used to initiate radical polymerization of 2-DAMA from the surface. The formation of a polymer layer on the surface was confirmed by IR spectroscopy and by increasing surface wettability observed using contact angle measurement.

Conclusions: Radical polymerization of 2-DAMA in solution initiated by atom transfer leads to formation of short polymer chains. Gold surface can be coated by poly(2-DAMA) using surface initiated radical polymerization.

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