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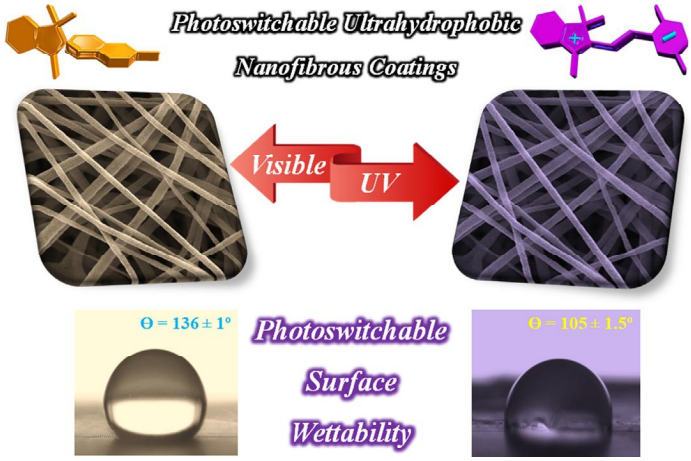
Regular Article

Photoswitchable surface wettability of ultrahydrophobic nanofibrous coatings composed of spiropyran-acrylic copolymers

Erfan Nezhadghaffar-Borhani [a], Amin Abdollahi [a], Hossein Roghani-Mamaqani [a,b,*], Mehdi Salami-Kalajahi [a,b,*]

[a] Faculty of Polymer Engineering, Sahand University of Technology, P.O. Box: 51335-1996, Tabriz, Iran
[b] Institute of Polymeric Materials, Sahand University of Technology, P.O. Box 51335-1996, Tabriz, Iran

GRAPHICAL ABSTRACT



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ABSTRACT

Hypothesis: Light-controlling of surface characteristics in polymeric coatings has been a significant research area because of its potential application in development of smart surfaces. Wettability of light-responsive polymeric coatings based on spiropyran photochromic compound could be tuned by light irradiation. This is mainly because of spiropyran isomerization between the hydrophobic and hydrophilic states.

Experiments: Light-responsive latex nanoparticles containing spiropyran moieties were synthesized by semi-continuous emulsion copolymerization of acrylate monomers, which have different chain flexibility depending on the copolymer composition. Photochromic properties of spiropyran in stimuli-responsive latex nanoparticles displayed dependence of photochromism intensity and its kinetics to flexibility of the polymer chains in addition to the polarity of media. Photoswitchable surface wettability of the spiropyran-containing acrylic copolymer coatings was investigated, where the photo-responsive coatings were prepared by solution casting and electrospinning methods.

Findings: The photoswitchable coatings prepared by solution casting and electrospinning methods showed significant differences in their physical characteristics and especially surface wettability. The

* Corresponding authors at: Faculty of Polymer Engineering, Sahand University of Technology, P.O. Box: 51335-1996, Tabriz, Iran.
E-mail addresses: r.mamaghani@sut.ac.ir (H. Roghani-Mamaqani), m.salami@sut.ac.ir (M. Salami-Kalajahi).

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