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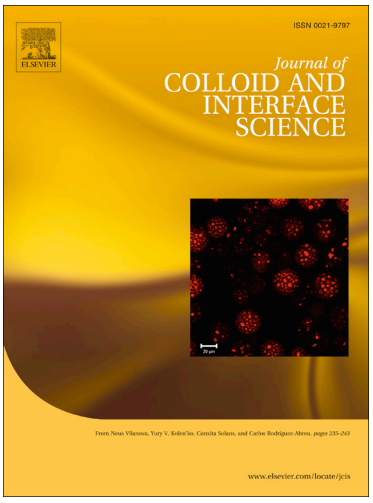

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Bioinspired bactericidal surfaces with polymer nanocone arrays

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Abstract

Infections resulting from bacterial biofilm formation on the surface of medical devices are challenging to treat and can cause significant patient morbidity. Recently, it has become apparent that regulation of surface nanotopography can render surfaces bactericidal. In this study, poly(ethylene terephthalate) nanocone arrays are generated through a polystyrene nanosphere-mask colloidal lithographic process. It is shown that modification of the mask diameter leads to a direct modification of centre-to-centre spacing between nanocones. By altering the oxygen plasma etching time it is possible to modify the height, tip width and base diameter of the individual nanocone features. The bactericidal activity of the nanocone arrays was investigated against *Escherichia coli* and *Klebsiella pneumoniae*. It is shown that surfaces with the most densely populated nanocone arrays (center-to-center spacing of 200 nm), higher aspect ratios and (>3) tip widths <20 nm kill the highest percentage of bacteria (~30 %).

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