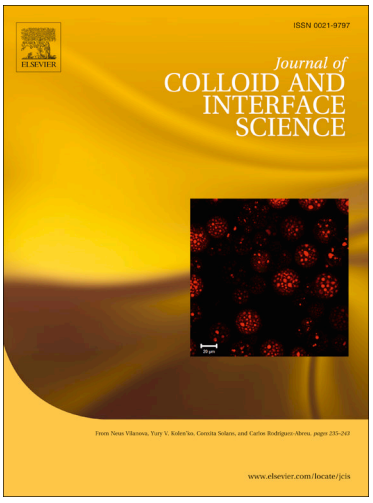

Tailored synthesis of polymer-brush-grafted mesoporous silicas with N-halamine and quaternary ammonium groups for antimicrobial applications

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Tailored synthesis of polymer-brush-grafted mesoporous silicas with N-halamine and quaternary ammonium groups for antimicrobial applications

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Abstract Antimicrobial mesoporous materials with polymer brushes on the surface were prepared, and their structure and antimicrobial performance investigated. Poly ((3-acrylamidopropyl) trimethylammonium chloride) (PAPTMAC) modified mesoporous silica was prepared by a polymer-brush-grafted method through treatment with the initiator 4,4'-azobis (4-cyanovaleric acid) (ACVA) and polymerized with (3-acrylamidopropyl) trimethylammonium chloride (APTMAC). A covalent bond was formed between mesoporous silica and N-halamine precursor; N-H bonds were successfully transformed to N-Cl bonds after chlorination. Morphology and structure of mesoporous silica were affected to some extent after modification. The surface area of the polymerized sample decreased, but was sufficient for further applications. Compare to the original sample, antimicrobial properties of the polymerized samples with quaternary ammonium groups (QAS) increased slightly.