Abstract

The integration of biological building-blocks with synthetic nanomaterials may permit unprecedented ability to detect, disinfect and completely remove pathogens in water. We hereby described the synthesis of biodegradable, interpenetrating polymeric networks of poly (amic) acid (PAA), glutaraldehyde-derivatized PAA (PAA-GA) and chitosan-modified poly (amic) acid (PAA-CS) using phase-inversion procedures. The characterization data from NMR, FT-IR, SEM and cyclic voltammetry confirmed the successful formation of electroactive, bifunctional, glutaraldehyde-linked PAA membranes. Toxicological, electrochemical and mechanical characterization data showed the successful formation of non-toxic, biodegradable, porous, free-standing and mechanically strong membranes. PAA-GA showed the highest modulus of 568.1 Mpa followed by PAA-CS-GA (495.0 Mpa). The optimized membranes were tested against three of the most common drinking water contaminants, namely *Escherichia coli, Citrobacter freundii* and *Staphylococcus epidermidis* with 100% removal achieved using dead end filtration and tangential flow filtration.