Chicken Feathers Derived Nanomembrane for Water Purification

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One of the most serious global challenges is inadequate access to fresh water, that is predicted to grow worse in the future as demand continues to rise due to ever increasing world population, rapid industrialization and greater energy needs. Clean water is essential to protect human and any other life on the planet earth. However, one tenth of the global population do not have access to safe drinking water. Conventional approaches such as reverse osmosis, decontamination and disinfection can address many water problems. However, these methods are often chemically, energetically and operationally intensive and, thus require considerable infusion of capital. Herein, we are proposing the development of an integrated low cost, robust and efficient water treatment technology based on graphene oxide/ keratin with a potential to remove metals, organics and pathogens in a single treatment without further stressing environment. In this study, graphene oxide will be modified with the epoxy, keratin will be extracted from chicken feathers and hybridized with modified graphene oxide to develop the membrane. Furthermore, the membrane properties will be evaluated with XRD, AFM, Raman spectroscopy, XPS, solid state NMR and TEM. The water purification performance of the membrane will be tested and compared with the commercially available membranes. This study will open up new horizons to exploit unique properties of both chicken feathers and graphene oxide for water purification.