A Green Route for Fabrication of Three-Dimensionally Ordered Porous Nanocomposites

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Synthesis and modification of nanocomposites lay the foundation of the unprecedented advances of nanotechnology in scientific and industrial areas over the past years. Growing attention has been paid to developing preparation methods with high time efficiency, simplicity, and scalability as well as abidance by the concept of green chemistry. Gamma irradiation with properties of energy-intensive and time-consuming process is in the forms of electromagnetic waves providing an alternative types of energy, which directly give rise to atom or molecule ionization, electron transition, vibrational transition, and rotational transition in the irradiated substances. In this study, we showed a reduced graphene oxide embedding a Prussian blue in a polyvinylpyrrolidone-based polymer membrane on a fabric with a porous three-dimensionally ordered architecture and interconnected network structure was successfully synthesized using green route technology for fabrication. The membrane exhibited an ultra-high stability in water at low pH levels due to its highly-porous network structure and demonstrated excellent stability and remediation when used as an adsorbent for cesium removal.