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Abstract:

Carbon quantum dots (CQDs), a kind of zero-dimensional carbon-based nanomaterials containing a carbon core with a tiny size of only several nanometers and a shell linked with functional groups, have shown great potential in fabricating high-performance water treatment membranes due to their excellent hydrophilicity, tunable size and surface properties, and favorable polymer affinity. Herein, three functionalized CQDs with carboxyl, amino and sulfonic acid groups, respectively, were synthesized and further incorporated into the polyamide layer of thin-film nanocomposite (TFN) membranes via interfacial polymerization. The influences of functional groups of CQDs on the membrane properties were systematically investigated. Benefiting from the advantages of excellent hydrophilicity and ultra-small size of CQDs, all the TFN membranes incorporated with CQDs exhibited