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Synthesis of porous materials of high mechanical strength with graphene quantum dots

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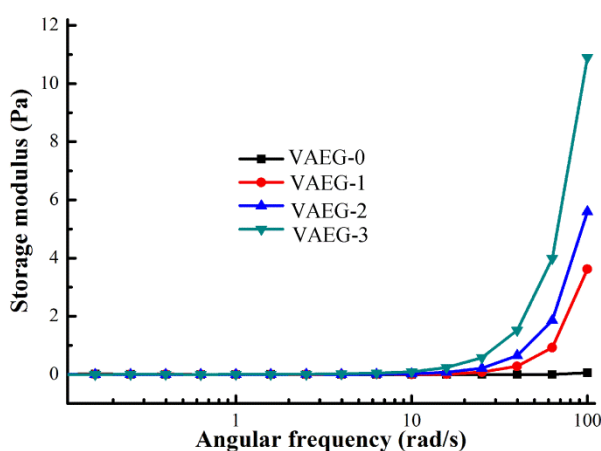
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Graphical abstract



Strong fluorescence, excellent mechanical and permeable organic porous polymers VAEG-n were prepared and showed good application potential as chromatographic packing.

Abstract: A series of porous materials with good mechanical and fluorescence properties enhanced by graphene quantum dots (GQDs) were prepared using surfactant reverse micelle swelling method with acrylamide (AAM) and 1-vinylimidazole (VIM) as monomers, ethylene glycol dimethacrylate (EGDMA) as crosslinking agent and azobisisobutyronitrile (AIBN) as initiator. Effects of additional amount of GQDs on the pore structure, fluorescence property, zeta potential and mechanical properties of the porous materials were systematically investigated. The surface area and pore volume increased as introduction of GQDs, while average pore width increased at first and then decreased with the amount of GQDs increasing, verifying the successful preparation of the porous materials. The fluorescence intensity changed to certain degree by the introduction of GQDs, which might result from photoelectron transfer between the GQDs and polymer matrices. The mechanical strength of the porous materials was greatly enhanced with introduction of GQDs due to the increase in storage modulus and permeability. The present work will shed light on the preparation of porous materials with high mechanical strength and fluorescence.

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