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Green synthesis of amphipathic graphene aerogel  
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**Abstract**

Graphene aerogels have been extensively studied in water treatment and oil remediation. We report a mild and green method to prepare a 3D-columnar graphene aerogel. The aerogel was synthesized by using polyvinyl alcohol (PVA) and stearic acid (SA) as crosslinking agents to construct a framework of reduced graphene oxide (RGO). The interaction between PVA, SA, and stacked RGO sheets created a mechanically very robust aerogel. The aerogel possesses ultra-light performance with the density ranging from 4.9-10 mg cm<sup>-3</sup>. The aerogel also demonstrated ultrafast oil absorption, good fire-resistance, and excellent mechanical properties. The adsorptive capacities are in the range of 105-250 times of its original weight for various organic liquids after the absorption. The aerogel also exhibited a strong durability and reusability, and after ten cycles of absorbing-squeezing, the adsorptive capacity is nearly unchanged, indicating potential application in practical oil remediation.

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