
Shuang Zhou

Shuang Zhou¹, Carla Bittencourt², Stephan Werner³, Catharina Haebel³, Peter Guttmann³, Wenjiang Li^{1*}, Rony Snyders^{1,2}

¹Key Laboratory of Display Materials & Photoelectric Devices, School of Materials Science and Engineering, Tianjin University of Technology, Tianjin 300384, PR China.

²Chimie des Interactions Plasma Surface, CIRMAP, University of Mons, Mons, Belgium.

³Research group X-ray microscopy, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Berlin, Germany.

1467693061@qq.com

Reduced graphene oxide/carbon hybrid aerogels from cellulose and graphene oxide for oil/water separation

Recently, reduced graphene oxide/carbon hybrid (RGO/CH) aerogels with outstanding physicochemical properties have exhibited potential application in widespread fields, and therefore attracted extensive attention. RGO/CH aerogels are synthesized by pyrolysis of graphene oxide /cellulose aerogels that are prepared by dissolving of cellulose in N-methylmorpholine-N-oxide (NMMO) monohydrate solvent, a nontoxic and environmentally friendly solvent, followed by gelation, regeneration and freeze drying. The prepared RGO/CH aerogel possesses a low apparent density in the range of 0.073-0.156 g cm⁻³, and presents highly hydrophobic and oleophobic properties with a high water contact angle up to 112° (Figure 1a). The porous 3D network structure of RGO/CH aerogels makes it to be an excellent candidate as absorber for oil/water separation (Figure 1b). Moreover, the absorbed oil could be removed by burning, and the oil sorption was still as high as 90% of the original sorption capacity after 5 cycles.

References

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Figures

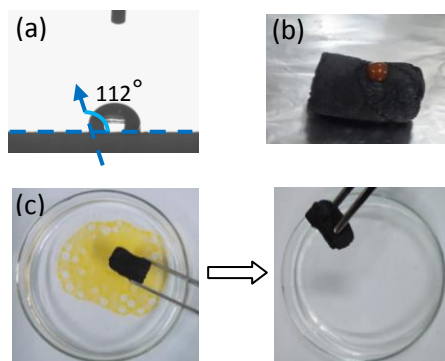


Figure 1: (a) The water contact angle of RGO/CH aerogels (b) Water stained with Sudan I was dropped on the surface of RGO/CH aerogel (c) Removal of corn oil from the water surface using RGO/CH aerogels