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A Robust, Superhydrophobic Graphene Aerogel as a Recyclable Sorbent for Oils and Organic Solvents at Various Temperatures

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Abstract:

To address oil spillage and organic contaminant problems, the preparation of efficient sorbent materials is of great importance for global environment and water source protection. Despite extensive studies, sorbents with both high efficiency and recyclability are still desired, particularly with the outstanding sorption performance for different temperature environmental conditions. Herein, we report a robust reduced graphene aerogel (rGA) as an efficient and recyclable sorbent for oils and organic solvents, which shows highly efficient absorption of various oils and organic solvents (up to 19-26 times of its own weight) and excellent recyclability (>5 times) by heat treatment. Moreover, the absorption ability of rGA can be maintained over a wide temperature range of -40 °C to 240 °C, which can be attributed to the inherent excellent thermal stability of graphene and good heat dispersal of three dimensional network structure. Based on these excellent properties, the rGA is considered to be an ideal material can be employed for separation and absorption of waste oil and organic contaminants from the water surface at various temperatures.

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