Preparation and application of graphene glass fiber

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Graphene glass fiber (GGF) is a new advanced graphene composite material developed through chemical vapor deposition (CVD) method with graphene covering on the surface of glass fiber. Glass fiber is a commercial lightweight structural material with high mechanical strength and flexibility, and has been widely used as a reinforcing material in aircraft, automobiles, etc. Considering the intrinsic excellent infrared properties of graphene and glass fiber, a dual-infrared-emitter design was reasonably constructed in GGF.[1] Dual-emitter GGF followed the law of gray-body radiation, showing high infrared radiation capability. Meanwhile, its infrared radiation can be effectively modulated through the band structure engineering of graphene.[2] Graphitic nitrogen doping can regulate the infrared emissivity of GGF from 0.96 to 0.68 under the premise of keeping high solar absorption. GGF showed promising potentials targeting the high-performance photothermal conversion for electric-energy-free crude oil collection.

References

[1] Hao Yuan, Hui Zhang, Kewen Huang, Yi Cheng, Kun Wang, Shuting Cheng, Wenjuan Li, Jun Jiang, Junliang Li, Ce Tu, Xiaobai Wang*, Yue Qi*, Zhongfan Liu*, ACS Nano 16 (2022), 2577.
[2] Yi Cheng, Shuting Cheng, Bingbing Chen, Jun Jiang, Ce Tu, Wenjuan Li, Yuyao Yang, Kewen Huang, Kun Wang, Hao Yuan, Junliang Li, Yue Qi*, Zhongfan Liu*, J. Am. Chem. Soc. (2022) 144, 15562-15568.

Figures

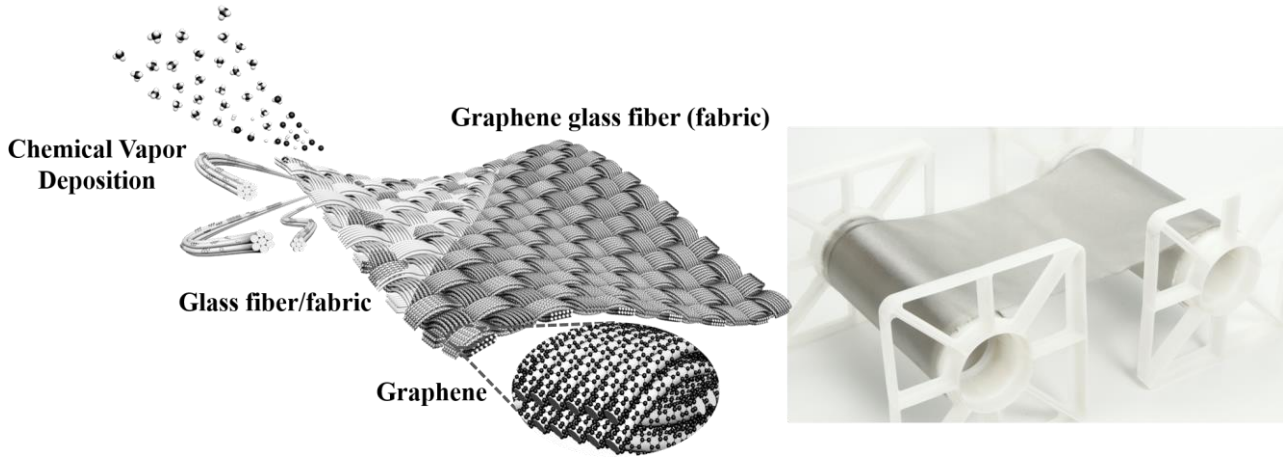

Figure 1: Graphene glass fiber (fabric)prepared by chemical vapor deposition strategy