



Multifunctional non-woven fabrics of interfused graphene fibres

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INTRODUCTION

Non-woven graphene fibre fabrics (GFFs) composed of randomly oriented and interfused graphene fibres with strong inter-fibre bonding were fabricated through a wet-fusing assembly approach.

Features:

- Porous
- Lightweight (0.22 g cm^{-3})
- Flexible
- High in-plane electrical conductivity ($2.8 \times 10^4 \text{ S m}^{-1}$)
- Prominent thermal conductivity ($301.5 \text{ W m}^{-1} \text{ K}^{-1}$)

Applications:

- Ultrafast responding electrothermal heaters
- Durable oil-adsorbing felts
- Efficient electrodes for energy devices

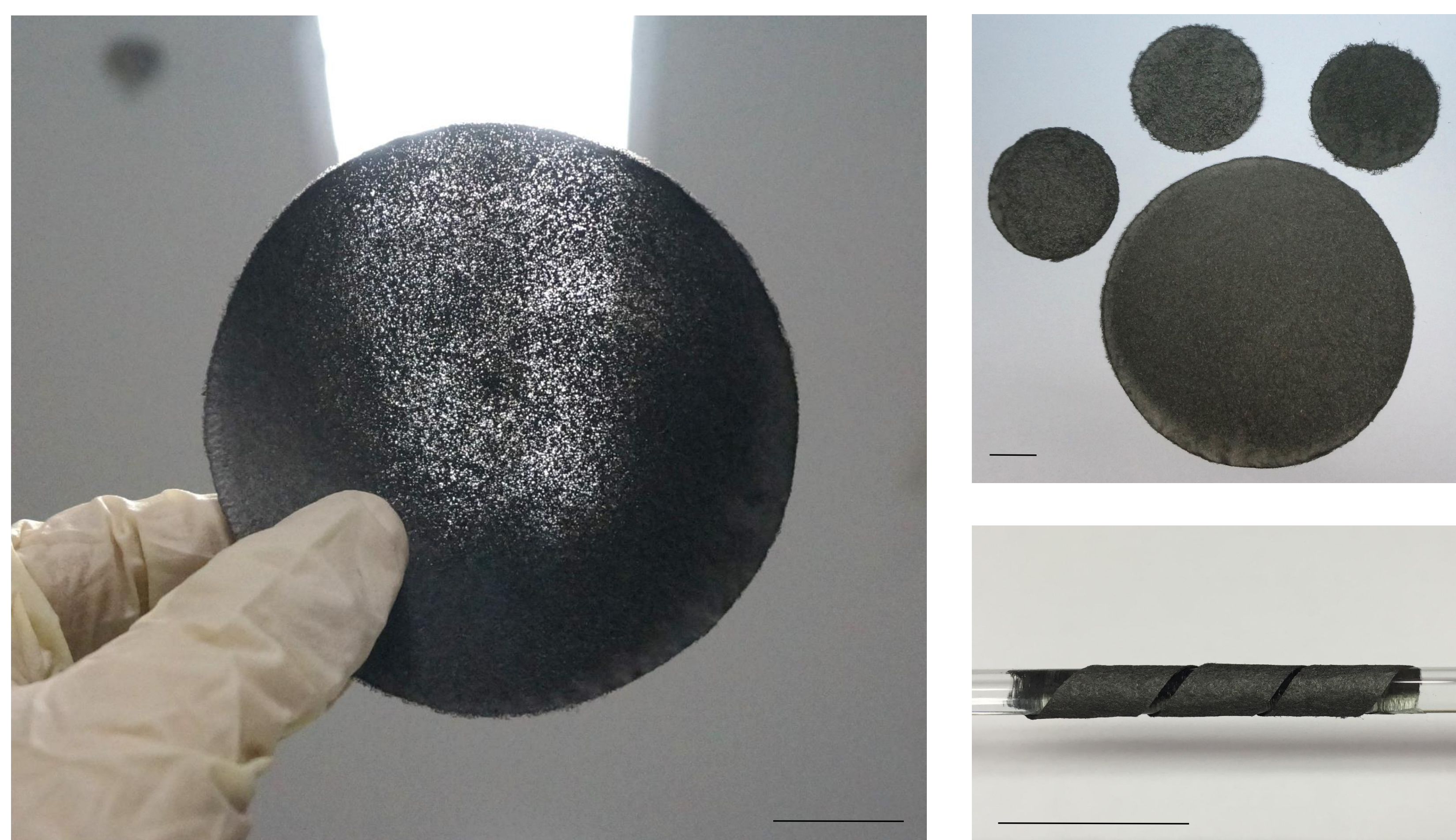


Fig.1 The GFFs are porous and flexible

RESULTS & DISCUSSION

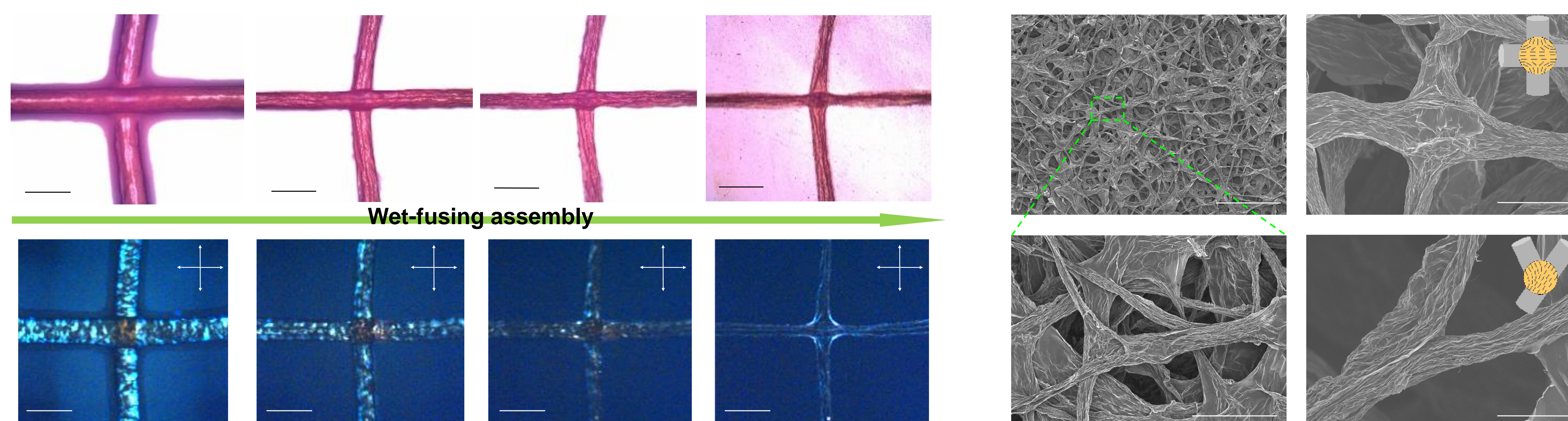


Fig.2 The wet-fusing assembly process makes graphene fibres interfused at junctions thus significantly reduces the contact resistance between fibres

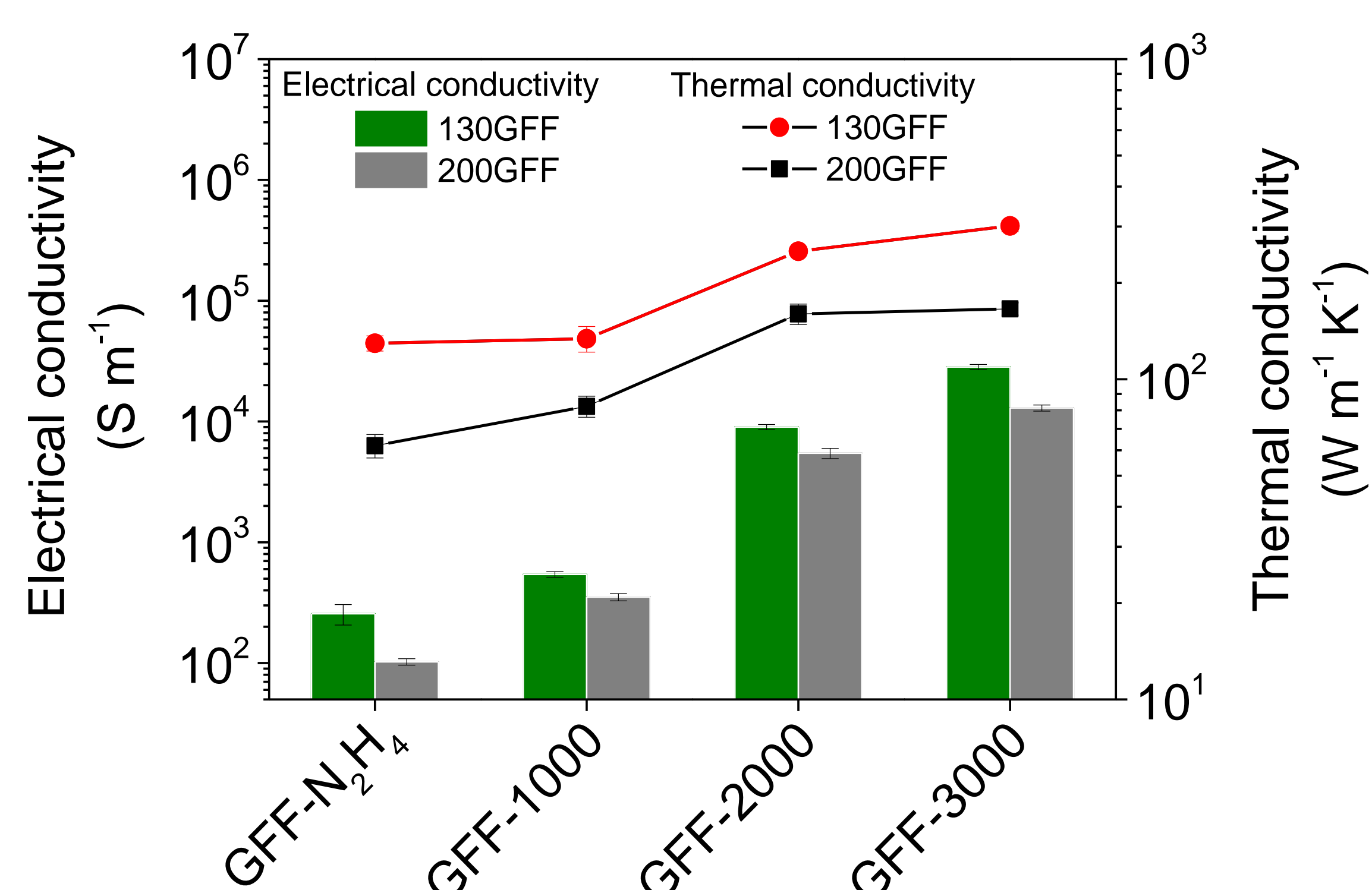


Fig.3 Electrical and thermal conductivities of GFFs

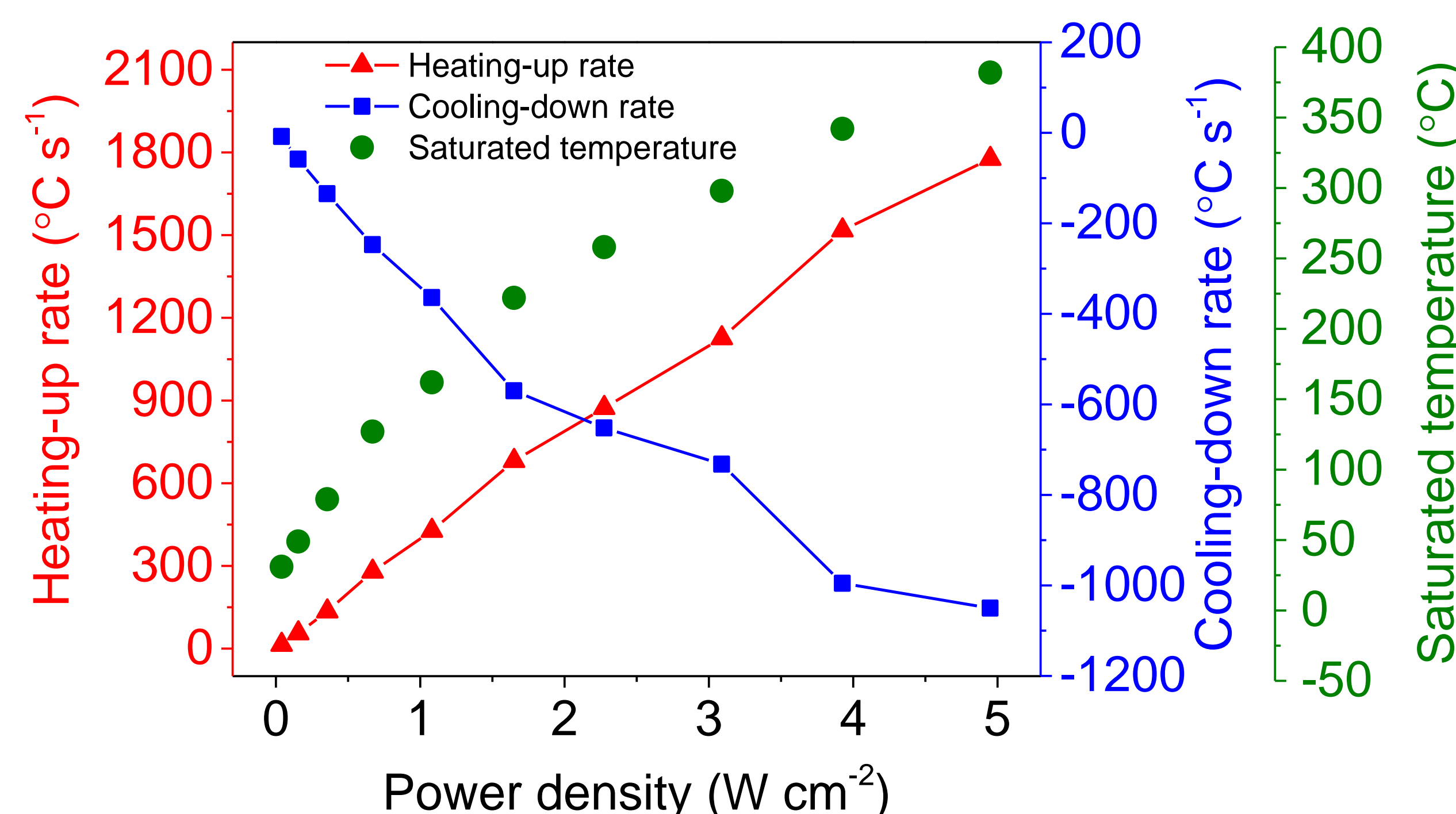


Fig.4 Electrothermal performance of GFFs

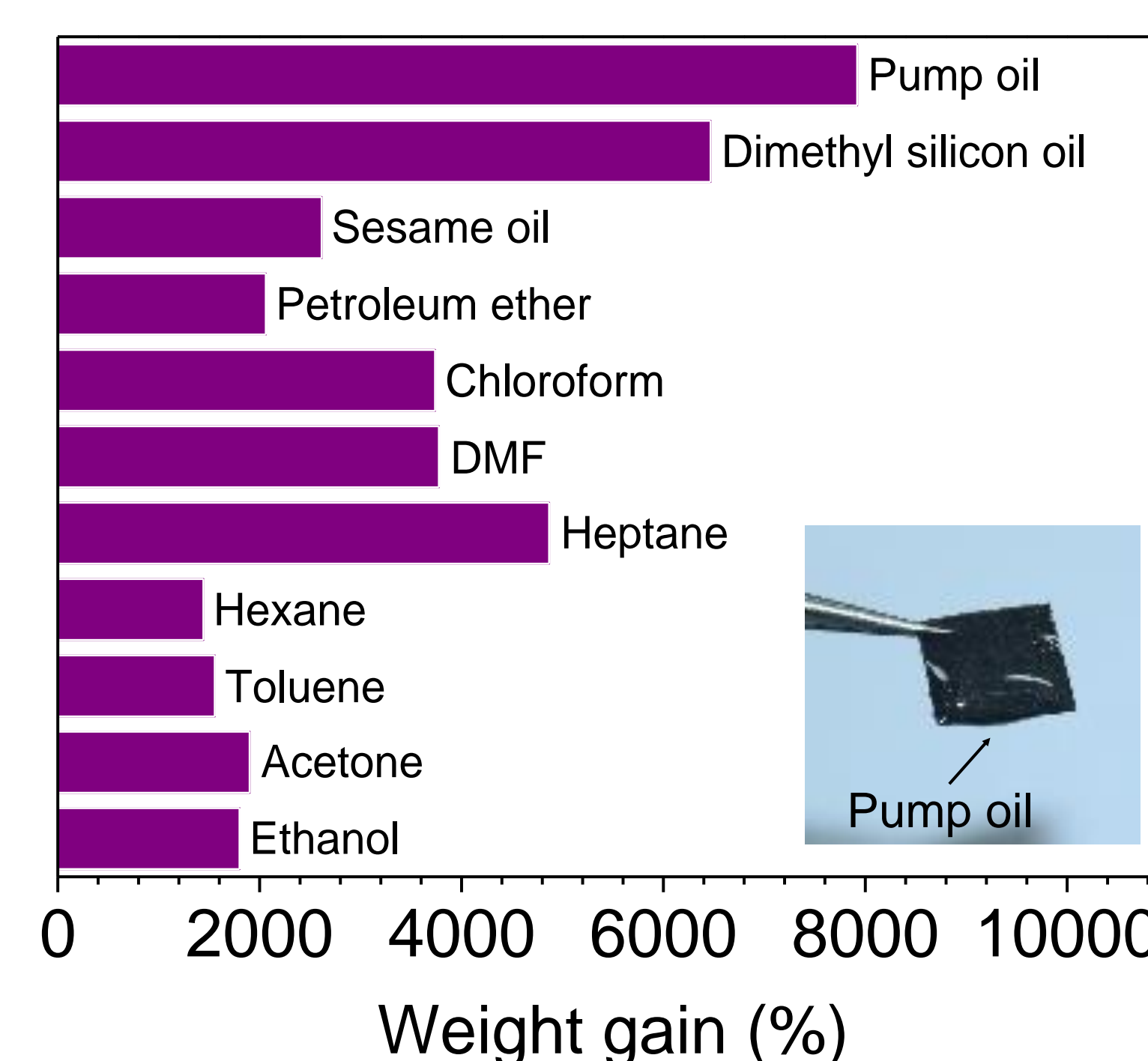


Fig.5 Adsorption capacities of GFFs for various organic liquids

CONCLUSIONS

- ◆ The interfused network structure endows GFFs with mechanical robustness, flexibility and outstanding conductivities
- ◆ The fabrication process is simple and able to be a general strategy for GFFs with designed fibre structures and compositions
- ◆ A wide range of applications can be envisioned for such multifunctional fabrics

ACKNOWLEDGEMENTS

National Natural Science Foundation of China (Nos. 21325417 and 51533008)

MOST National Key Research and Development Program (No. 2016YFA0200200)

State Key Laboratory for Modification of Chemical Fibres and Polymer Materials, Donghua University (No. LK1403)

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Zheng Li, Zhen Xu, Yingjun Liu, Ran Wang and Chao Gao. *Nat. Commun.* 2016 accepted