

Yihe Zhang

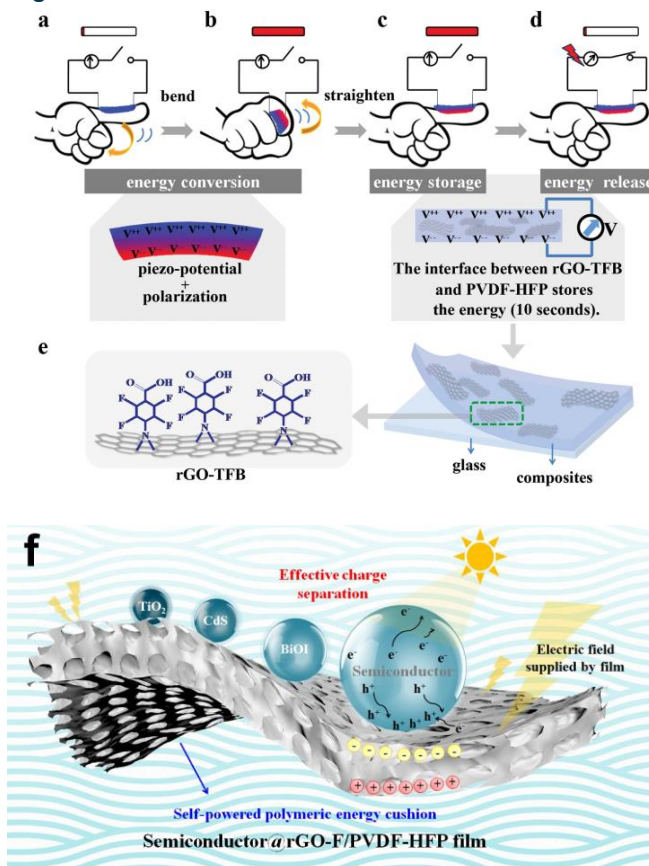
Qi An, Wangshu Tong, Xuelian Yu, Li Sun, Hongwei Huang, Ke Wang
China University of Geosciences, Xueyuan Road 29, Beijing, China

zyh@cugb.edu.cn

Graphene Composites as Energy, Catalyst, Environmental and Biomedical Materials, and Full Utilization of Graphite-Mining

Graphene is considered as one potential revolutionary material, due to its collective properties of mechanical strength and flexibility, tunable electronic behavior, optical transparency, etc. Most graphene-related applications are based on graphene composites, as a result of a trade off between performance and cost. In the past decade, our group has demonstrated a series of graphene composites aiming at energy storage and transformation^[1-5], photocatalysis^[6-9], biomedical devices^[10-13], etc. This presentation illustrates some typical works, such as a generator and in situ storage unit based on reduced graphene oxide (rGO)-PVDF-HFP film, and several novel graphene based-electrodes in lithium-ion batteries and super-capacitors. Meanwhile, the explosive development in graphene also stimulates exploitation of graphite. Consequently, a discussion about utilizing all the component during graphite-mining is also carried out, including the flake graphite, low grade graphite, tailings, and so on.

Figures



References

- [1] W. S. Tong, Y. H. Zhang et al, *Advanced Functional Materials*, 25 (2015) 7029-7037
- [2] H. T. Li, H. Dai, Y. H. Zhang et al, *Angew. Chem. Int. Ed.*, 56 (2017) 1-7
- [3] L. Q. Bai, Y. H. Zhang et al, *Nano Energy*, Accepted
- [4] L. Sun et al, *Chem. Commun.* 54 (2018) 10172-10175
- [5] L. Sun, Y. Zhang et al, *Nanoscale*, 9 (2017) 18552-18560
- [6] W. S. Tong, Y. H. Zhang et al, *Nano Energy*, 53(2018) 513-523
- [7] Q. Zhang, Q. An et al, *Nanoscale*, 7 (2015) 14002-14009
- [8] Q. Zhang, Y. H. Zhang et al, *Scientific Reports* 7 (2017) 12296
- [9] X. L. Yu, Y. H. Zhang et al, *Appl. Catal. B-Environ.* 182 (2016) 504-512
- [10] K. Nie, Q. An et al, *RSC Advances*, 5 (2015) 57389-57394
- [11] Y. Zhang, Q. An et al, *Small* 14(2018) 1802136
- [12] L. Liu, X. L. Yu et al, *New J. Chem.*, 41(17) (2017) 9008-9013
- [13] L. Liu, Y. H. Zhang et al, *Analyst*, 142(5) (2017) 780-786

Figure: (a-f) Schematic illustrations of rGO-PVDF-HFP film as both energy generator and in situ Storage Unit; (f) rGO-PVDF-HFP film as substrate for photocatalysis.