

EPFL Valais/Wallis SEMINAR

22.12.2020, 10:00-11:00, EPFL Valais/Wallis ZOOM Seminar

Fabrication and Properties of Fibre-based Composite Phase Change Materials

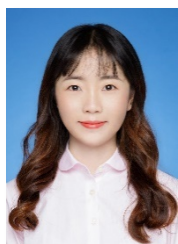
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Development of renewable energy such as discarded thermal energy, solar energy, and electric energy is urgent to overcome energy crisis and environmental deterioration. Thermal energy storage is of vital importance for energy conversion and utilization process. Organic phase change materials (OPCMs) are attractive energy storage materials because of their excellent ability to absorb and release latent heat during phase change process. In particular, the high chemical stability, appropriate phase transition temperature and small volume change make OPCMs a potential material for clean energy applications. Despite the excellent properties, some inherent defects constrain the usage of PCMs, such as leakage during the phase change process. [1] Particularly, OPCMs have low thermal conductivity and most of them are electrically insulating, which have important influences on the energy conversion and storage ability. Considering the mentioned defects of PCMs, combination of PCMs with conductive supporting materials is a way to improve the shape stability as well as to reduce the gradient for electro/photon to thermal conversion. [2] Herein, fibre-based phase change composites for thermal/solar/electric energy collection were fabricated by different ways. The composite PCMs with improved shape stability, thermal conductivity and stimuli-response property hold great potential at applications like energy harvesting, wearable devices and protective garments.

References:

- [1] Li, Y., et al. From biomass to high performance solar-thermal and electric-thermal energy conversion and storage materials. *J. Mater. Chem. A* 2014, 2, 7759–7765.
- [2] Ji, H, et al. Enhanced thermal conductivity of phase change materials with ultrathin-graphite foams for thermal energy storage. *Energy Environ. Sci.* 2014, 7, 1185–1192.



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Born in 1994 in Shandong, China, Zixuan Niu graduated from Donghua University with a Bachelor degree in Textiles in 2017. Now, she is doing her Ph.D. at Tongji University on “Fabrication and Properties of Fibre-based Composite Phase Change Materials” under the supervision of Prof. Dr. Weizhong Yuan. She has interests in energy storage materials and wearable devices.