MULTISCALE THEORY AND MODELING OF ADVANCED NANOCOMPOSITES

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MINISYMPOSIUM

Nanocomposites have garnered considerable attention in both fundamental nanoscience research and practical applications due to outstanding mechanical, electrical, thermal, and other fantastic functions. In nanocomposites, the incorporation of micro- and nano-scale constituents has led to enhanced material performance while simultaneously increasing the complexity and diversity of the material composition. Consequently, the investigation and analysis of nanocomposites necessitate the consideration of multiple length scales to establish relationships between macroscopic properties and various hierarchical structures at the nanoscale and microscale levels. The multiscale approach facilitates the prediction of material performance and enables the optimization of composite material design. This minisymposium aims to highlight breakthroughs, progress, and challenges in the multiscale theory and modeling of nanocomposites.

Minisymposium topics include but not limited to the theoretical and simulation methods of multiscale analysis of:

1. Designing and optimizing structure and performance of nanocomposites;
2. Assembling advanced nanocomposites;
3. 1D fiber/2D film/3D bulk nanocomposites based on nanoclay, carbon nanotube, graphene, MXene, boron nitride, etc.;
4. Multifunctional nanocomposites including mechanical, electrical, thermal, EMI shielding, etc.;
5. Smart and intelligent nanocomposites including self-healing, self-monitoring, adaptive, environmental response, etc.;
6. Nanocomposites used in electrical and energy devices, such as supercapacitors, batteries, etc.;
7. Nanocomposites for actuator, artificial muscle, sensor, etc.;
8. Light-weighted structural nanocomposites used in vehicle, aerospace, etc.