

Recent progress on thermally conductive and electrical insulating rubber composites: design, processing and applications.

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Rok wydania

2020

Czasopismo

Composites Communications

Numer woluminu

22

Strony

100430/1-100430/12

DOI

10.1016/j.coco.2020.100430

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Thermal management plays a vital role in the performance, lifespan and stability of electronic devices, especially with the new emergence of 5G network. High thermal conductivity (TC) and electrical insulating rubber composites are widely used as thermal interface materials owing to their good performance. Herein, fundamental design principles of rubber composites with high TC and excellent electrical insulation are emphasized. Properties and the latest research progress of thermally conductive ceramic fillers (BN, Al_3O_2 , AlN, etc.) are introduced at length. Besides, factors that influence thermal interfacial resistance, including geometry, preparation methods and interfacial compatibility, are overviewed as well. More attention is paid to strategies for 2D filler orientation and 3D structure engineering of composites which are expected to achieve higher TC in horizontal and/or vertical direction. Finally, emerging applications of thermally conductive and insulating rubber composites in electronic industry and new-energy automobile are demonstrated.

Słowa kluczowe

Thermally conductive composites, Electrical insulation, Rubber, Ceramic fillers, Filler orientation, 3D interconnected network

Adres publiczny

<http://dx.doi.org/10.1016/j.coco.2020.100430>

Strona internetowa wydawcy

<http://www.elsevier.com>