Wave absorption and energy storage occasions

The proliferation of radar, electronics, and wireless devices has led to a notable rise in electromagnetic radiation pollution and compatibility issues [[1], [2], [3]].Microwave absorption materials (MAMs) are pivotal in mitigating incoming electromagnetic waves, converting them into thermal energy, or employing interference phase cancellation to diminish the ...

As a hot material, aerogel has a unique three-dimensional (3D) porous structure, possessing high porosity and low density [5], [6].Based on the loss theory of electromagnetic waves (EWs), the synergistic effect of dielectric and magnetic losses can significantly enhance the EWA capacity of materials [7].Hence, it is common to combine the aerogel with different ...

Nickel-zinc ferrite (Ni0.5Zn0.5Fe2O4) powders were prepared by the conventional solid-state route and sintered at 1100 and 1300 °C for utilization as a tile electromagnetic wave absorber.

Therefore, the superior EM wave absorption performance of NCFs@WS 2 is attributed to the good impedance matching, as well as the synergistic effect of conduction loss and polarization loss. This work enriches the research on carbon fiber-based composites and their EM wave absorption performance. ... The storage capacity of EM energy is ...

In addition, the electromagnetic wave absorption performance of the sample can be effectively improved through morphology control and construction of heterojunctions [17].Wang et al. [18] synthesized the defect-rich WS 2 nanoflowers by the cold plasma method. The formation of defect vacancies greatly promotes the dipole polarization of the material, ...

Zhang et al. 30 investigated the effect of water content and soluble cations on the electromagnetic wave absorption of water-bentonite composites, focusing on enhancement of conduction loss from salt solution and interface polarization from layered bentonite on the absorption performance. Although water can be precluded during pyrolysis, it is ...

It is difficult for green sustainable lignin-based materials to simultaneously obtain efficient electromagnetic wave absorption (EMWA) and supercapacitive energy storage (SCES), which has not yet been reported. Herein, the light-weight lignin-based carbon nanofibers (LCNFs) with proper pore size, we ...

Refining the electromagnetic wave absorption characteristics of traditional metal-organic framework (MOF)-derived carbon composites remains a challenge because of their discontinuous conductive path. To overcome this limitation, in this work, MOF-derived hierarchical Cu9S5/C nanocomposite fibers are fabricated by electrospinning and subsequent ...

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As a lot of electromagnetic pollution and interference issues have emerged, to overcome electromagnetic interference, prevent electromagnetic hazards, and develop new high-performance electromagnetic wave (EMW) absorbers have become a significant task in the field of materials science. In this paper, a three-dimensional (3D) carbon nanofibers network with ...

Chen et al. summarize the latest advancements in electromagnetic wave-absorbing materials by clarifying electromagnetic loss mechanisms, addressing impedance mismatches, and developing integrated design strategies. These advancements are pivotal in overcoming the challenges in broadband absorption, frequency band manipulation, and ...

To match the increasing miniaturization and integration of electronic devices, higher requirements are put forward for the electromagnetic wave absorption (EWA) and thermal conductivity (T c) of heat conduction-microwave absorption integrated materials (HCMWAIMs) to overcome the problems of electromagnetic wave (EMW) pollution and heat accumulation.

Rapid advancements in flexible electronics and military applications necessitate high-performance electromagnetic wave (EMW) absorbers. While huge breakthroughs in achieving high-attenuation microwave absorption, conventional EMW absorbing materials have single function and ambiguous absorption mechanisms. Herein, numerous gel-type absorbers ...

This process leads to an increase in the number of heterogeneous interfaces. The migration of free electrons at these multiphase interfaces is impeded, leading to the formation of charge aggregation. This aggregation indicates an elevated capacity for electrical energy storage and therefore a tendency to increase the value of e? [18 ...

Another key advantage of ocean wave energy is the minimal negative environmental impact compared to fossil fuel-based generation (Magagna et al., 2018).Life cycle emission comparisons present an estimate concerning the amount of emissions created by nearshore wave energy devices (Thorpe et al., 1999) general, these calculations show that ...

The microstructures and EM wave absorption performance of RGO/g-Fe 2 O 3 composites are shown in Figure 12. 72 The maximum RL of porous RGO/g-Fe 2 O 3 composites is -38 dB at 14.78 GHz. The effective absorption bandwidth is up to 5.8 GHz. The excellent EM wave absorption performance of RGO/g-Fe 2 O 3 is related to special structures and ...

Defect engineering in transition metal oxides semiconductors (TMOs) is attracting considerable interest due to its potential to enhance conductivity by intentionally introducing defects that modulate the electronic structures of the materials. However, achieving a comprehensive understanding of the relationship between micro-structures and ...

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