

CNF/Ag nanoparticle composite

- Waste-free CNF/highly dispersed, high-loading AgNPs composite
- Catalysts, conductors, antimicrobials, thermal control, solder paste

Overview

Cellulose nanofiber (CNF) and silver nanoparticle (AgNPs) composites serve as excellent dispersible carriers that maximize silver's conductivity, catalytic activity, and antimicrobial performance. CNF, being plant-derived and environmentally friendly, also aligns with SDG goals. **Conventional wet reduction methods, however, generate wastewater and require washing steps, leading to environmental issues and complex processing.**

This invention introduces **an ultrasonication-based method** that both disperses CNF uniformly and reduces silver oxide **to form CNF/AgNPs composites without harmful reagents**. The simple, waste-free process offers **higher silver loading and better silver dispersion than conventional methods**, enhancing silver's inherent properties.

Product Application

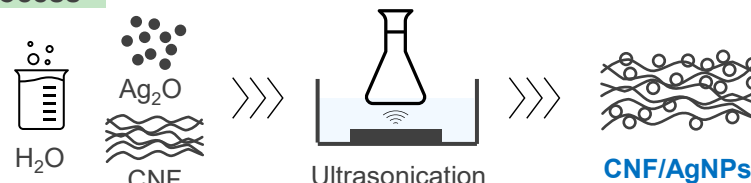
- ❑ Conductive films, antimicrobials, catalysts, solder paste
- ❑ Low-temperature solder, thermal management material

IP Data

IP No. : Not Published
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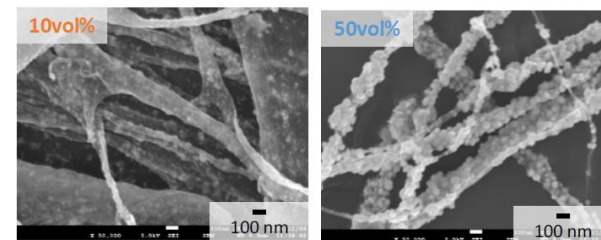
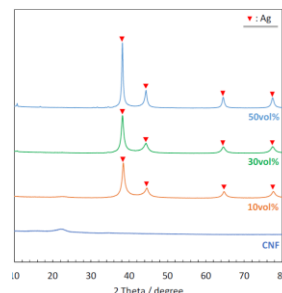
Features·Outstandings

Process



Eco-friendly simple process

CNF/AgNPs



Highly dispersed, over 50 vol% Ag loading

Maximizing Ag's conductive, catalytic, and antimicrobial properties.

Example : catalytic performance

Reduction test of 4-nitrophenol : CNF/AgNPs catalyst

Ag-based catalyst	T [°C]	k [s ⁻¹]	k _m [s ⁻¹ g ⁻¹]
CNF/AgNPs	25	7.66×10^{-4}	3549
AgNP-PG*1	25 ± 2	5.50×10^{-3}	1375
Ag@CMP*2	40	1.36×10^{-3}	17.0
SiO ₂ @AgNPs*3	22	2.66×10^{-3}	0.266

Superior k and k_m values due to highly dispersed AgNPs.

Companies interested in CNF/AgNPs mass production, material application, or development using our method, please contact us

Contact

*1 Baruah, B. et al., *Langmuir*, 294225–4234 (2013). *2 Cao, H. L. et al., *ACS Appl Mater Interfaces*, 95231–5236 (2017).
 *3 Wang, M. et al., *Appl Surf Sci*, 283389–395 (2013).

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