

Scientists develop novel transparent broadband electromagnetic interference shielding materials

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Fig. The samples of transparent EMI shielding materials fabricated through (a) a laboratory facility and (b) a pilot plant facility. Credit: NIMTE

The Flexible Optoelectronic Material Group led by Prof. Song Weijie at the Ningbo Institute of Materials Technology and Engineering (NIMTE) of the Chinese Academy of Sciences (CAS) has proposed and successfully fabricated visibly transparent electromagnetic interference (EMI) shielding materials with high EMI shielding effectiveness (SE) and visible transmittance. The study was published in *ACS Applied Materials & Interfaces*.

The development of microwave wireless communication facilitates people's daily life, but it also brings about more complex electromagnetic environment. The emerging 5G and 6G wireless telecommunications working at higher frequencies

and larger bandwidths would definitely provide an avenue to the Internet of Things (IoT), automated driving, [smart cities](#), while they challenge the EMI shielding materials as well. Novel EMI shielding materials need to be developed for preventing unwanted high-frequency microwave signals.

Recently, researchers at NIMTE developed visibly transparent EMI shielding materials using an ultrathin silver layer sandwiched by oxides (SLSO) as building blocks. The samples with a double-sided SLSO (D-SLSO) structure exhibited an EMI SE of over 60 dB for 10-40 GHz with a visible transmittance close to 90%, which is even comparable with those of bare polyethylene terephthalate (PET) and glass substrates.

In addition, the dual role of D-SLSO structure was clarified: it not only enhances EMI shielding via a Fabry–Pérot resonant cavity for microwave electromagnetic waves (EMWs), but also functions as antireflection coatings for visible EMWs.

The research group has been devoted to the optimization and large-area fabrication of D-SLSO EMI shielding materials. The D-SLSO materials with a width of 600 mm have been successfully produced through a pilot plant facility.

Moreover, the effectiveness and the stability of the transparent EMI shielding materials have been confirmed through applications in radio frequency (RF) devices.

More information: Changwei Yuan et al. Record-High Transparent Electromagnetic Interference Shielding Achieved by Simultaneous Microwave Fabry–Pérot Interference and Optical Antireflection, *ACS Applied Materials & Interfaces* (2020). DOI: [10.1021/acsami.0c05334](https://doi.org/10.1021/acsami.0c05334)

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