

Invisible Shield against Electromagnetic Interference

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In News: scientists from the Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru, have designed a metal mesh structure to construct an invisible shield against Electromagnetic Interference (EMI).

Highlights Invisible Shield against Electromagnetic Interference

- In a novel innovation, Indian scientists have designed a metal mesh structure to construct a transparent shield against EMI.
- Scientists from Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru, an autonomous institute of the Department of Science & Technology have fabricated these transparent and flexible EMI shields made of metal meshes using the crack templating method via spray coating which is pioneered in their laboratory. These can be used instead of a continuous film coating on the desired substrates or surface.
- **Metal Mesh Structure**
 - The CeNS team has developed a copper metal mesh on a polyethylene terephthalate (PET) sheet as its substrate, which is claimed to have exhibited a visible transmittance, a parameter of visible transparency, of about 85%.
 - Instead of a continuous film coating of a metal like copper on any transparent substrate such as glass or PET, where transparency can be compromised, CeNS team deposited metal mesh networks on the substrate, which covered only 7% of

the substrate's area.

- This metal mesh can be created on any desired substrates such as acrylic, polycarbonate, glass, etc. without compromising the conductivity of the electrodes.
- This makes metal mesh transparent compared to the continuous metal film that covers the entire area of the substrate.
- A metal mesh is said to provide better electromagnetic shielding compared to the same thickness of the continuous metal film

▪ **Benefits**

- It will isolate a device's energy so it doesn't affect anything else and blocks external energy from getting in.
- This 'invisible' shield can be used in various military stealth applications.
- It can cover electromagnetic wave emitter or absorber devices without compromising aesthetics.
- It is an important element for enhancing the stealth capability of a weapon platform

Electromagnetic Interference

- It is an electromagnetic emission that causes a disturbance in another piece of electrical equipment.
- Any device that has an electronic circuit can be susceptible to EMI.
- It compromises the performance of electrical equipment by obstructing and degrading data, sometimes even losing data completely.
- EMI can be attributed to a wide span of the electromagnetic spectrum including radio and microwave frequencies.

Centre for Nano and Soft Matter Sciences (CeNS)

- Is an autonomous research institute under the Department

of Science and Technology (DST), Government of India.

- DST provides core support to the Centre in the form of a grant-in-aid for conducting basic and applied research in nano and soft matter sciences.
- CeNS is located at Jalahalli, Bengaluru.
- The Centre is engaged in materials research at all relevant length scales. Specifically, the current activities are focussed on a variety of metal and semiconductor nanostructures, liquid crystals, gels, membranes and hybrid materials.
- The Centre was established in 1991 by an eminent liquid crystal scientist, Prof. S. Chandrasekhar, FRS. It was then known as Centre for Liquid Crystal Research, a registered scientific society in Karnataka with the objective to build a centre of excellence in line with the international trend those days on liquid crystal materials and devices.
- In 1995, it became an autonomous institute under the Department of Electronics (DOE), Government of India and in 2003, was brought under DST. Subsequently in the year 2010, the name was changed to Centre for Soft Matter Research. Recently in 2014, the Centre has further widened the scope of research activities to embrace nanoscience and technology and is now known as Centre for Nano and Soft Matter Sciences (CeNS).
- It is being mentored by Nano-Mission of the Government of India.