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ULTRA-TRANSPARENT FLEXIBLE TERAHERTZ POLARIZER

A new nanofabrication method for high-efficiency polarizers using small-sized wires (1 μm), a double-wire grid configuration, and transparent substrates.

+ Features

High transmittance
Large broadband operation (0.1-25 THz)
Extraordinary extinction ratio (60 dB in the range of 2-8 THz)
Small-sized wires (1 μm)
Double-wire grid configuration

+ Advantages

Transparent polymer substrates
High degree of polarization (> 99% in the range 1-15 THz)
Flexible material for curved surfaces
Cheaper and cleaner fabrication

+ Suggested applications

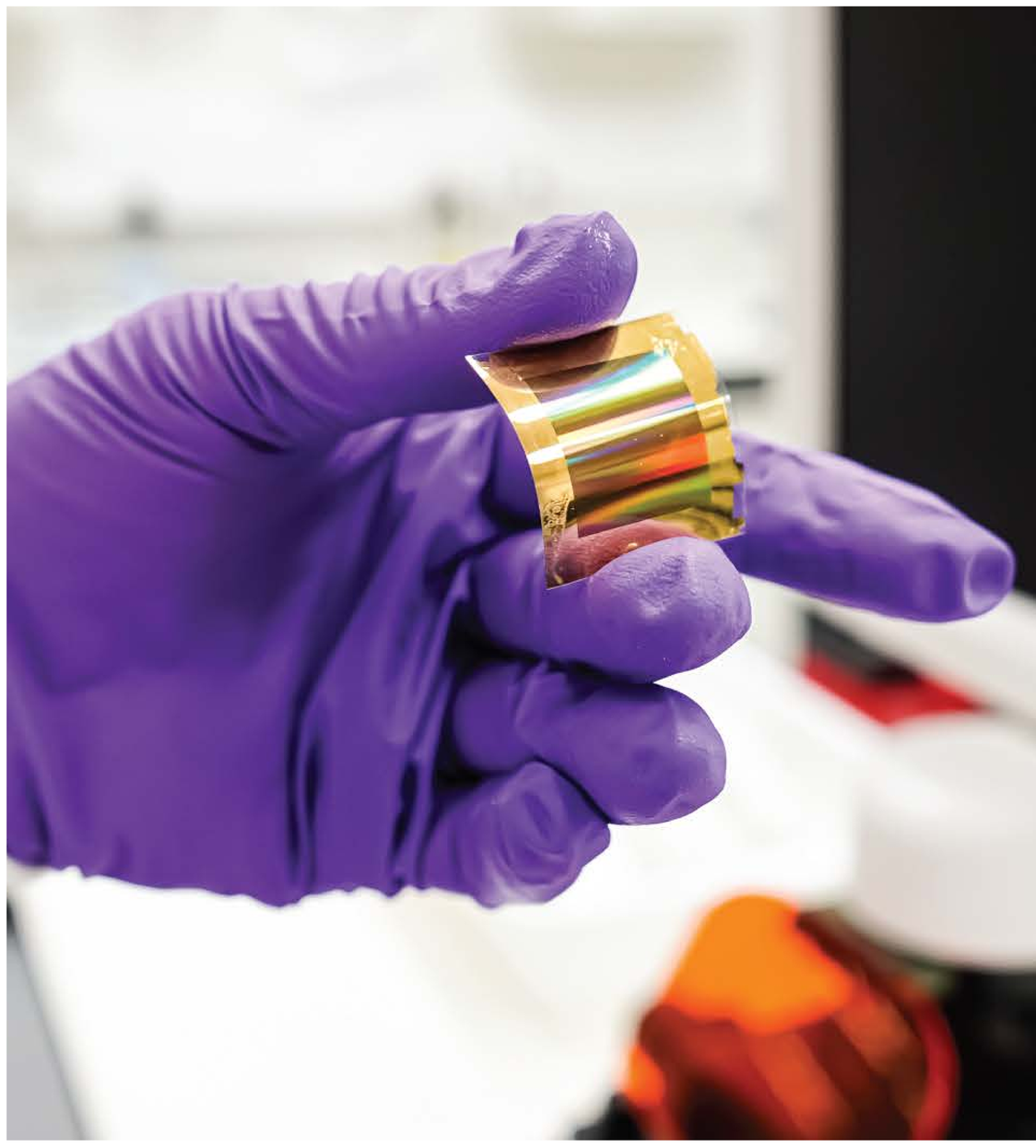
Security screening (to uncover concealed weapons/objects)
Medical imaging of superficial or soft tissues
Quality control in manufacturing processes
Ultrafast data communications

INL has developed an ultra-transparent flexible terahertz (THz) polarizer. A polarizer is an optical filter that lets light waves of a specific polarization pass through while blocking light waves of other polarizations, similar to sunglasses that filter light in the visible range.

These components can be integrated into THz equipment, such as sources and image acquisition setups, and applied in many different techniques including spectroscopy, microscopy, and astronomy to study and investigate materials.

Most commercial THz polarizers are free-standing wire grids of suspended micrometre-sized diameter wires. Large diameters, above 5 μm, is a consequence of using suspended wires. Alternatively, smaller micro-wires could be fabricated on top of a support substrate such as silicon, however, this material only transmits 45% of the light.

New materials such as cyclic olefin copolymer (COC) have much higher transmittance (as high as 90%), resulting in ultra-transparent polarizers. In addition, the double-wire grid configuration presents a much higher performance in obtaining polarized THz when compared to a single plane of wires.



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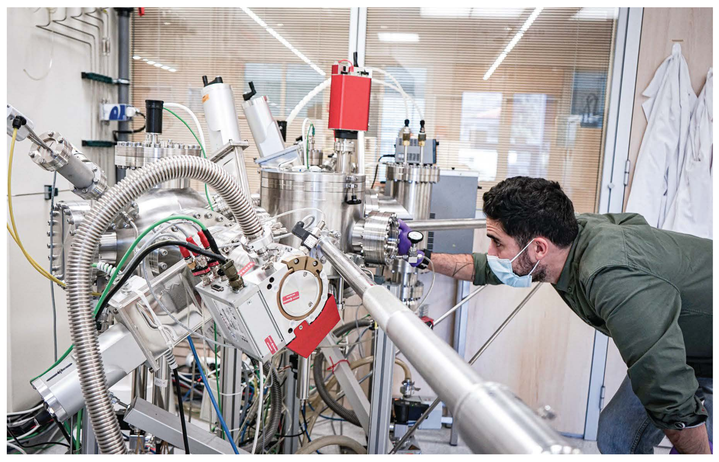

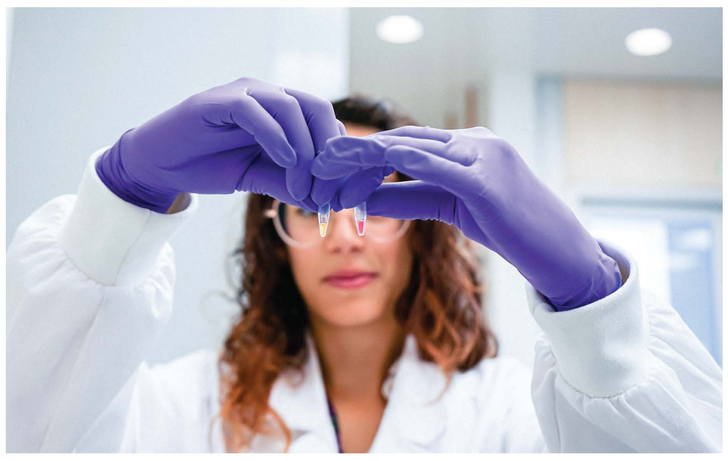

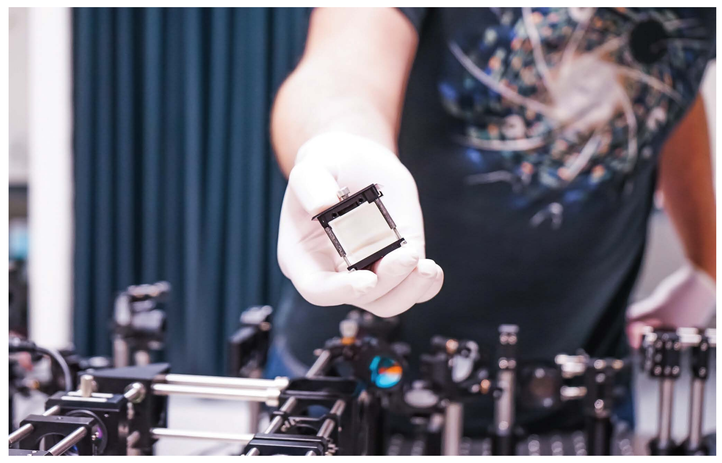

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Shaping the future together in Clean Energy, Food, Health, Smart Digital NanoSystems, Sustainable Environment and Advanced Materials & Computing.

01 SCIENCE

Discover our areas of research and expertise, where we dive into nanoscience and intermix various disciplines to transform it into nanotechnology.

02 TECHNOLOGY

By nourishing on our multiple disciplines in house and with partners, we develop and deploy solutions to the market.

03 SERVICES

INL has state-of-the-art scientific equipment which can be used by internal and external stakeholders within the research, technology, and innovation fabric. You can access this open facility with expert support, either remotely or in-person, for full-service or for independent use after initial in-house training.

04 SOCIETY

INL is committed to disseminating to all audiences the nanotechnology concepts, and bring society closer to our scientific developments. Visit our website and explore our activities and events.

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