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TiN/(Al,Sc)N Metal/Dielectric Superlattices for Metamaterial Applications in the Visible Range

A new metal/dielectric superlattice system, fabricated using standard silicon techniques, acts as a hyperbolic metamaterial in the visible range to enhance light harvesting and imaging performance.

Metamaterials are materials that have been engineered to have properties that are not found in nature. Visual metamaterials can bend and manipulate light in ways that allow sub-wavelength imaging, negative refraction, and quantum optics. Currently, only microwaves have been successfully controlled by metamaterials; however, research continues to find new materials than can manipulate visible wavelengths.

Purdue University researchers have developed a new metal/dielectric superlattice system that behaves as a hyperbolic metamaterial in the visible range. Made out of nitride materials, this new system can be fabricated using standard silicon techniques. This fabrication allows the materials to be optically tuned to provide enhanced performance in light harvesting and imaging applications.

Advantages:

-Standard silicon fabrication

-Operates in visible range

Potential Applications:

-Light harvesting

-Imaging

TRL: 2

Intellectual Property:

Technology ID
66323

Category
Semiconductors/Fabrication & Process Technologies
Materials Science & Nanotechnology/Nanomaterials & Nanostructures
Materials Science & Nanotechnology/Advanced Functional Materials

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