UNIVERSITY OF MINNESOTA
Driven to Discover℠

Plasmonic Device Produces Collimated, Monochromatic Light from Heat

Thin Metal Film Plasmonic Device

Ultrasmooth thin metal films with a nanoscale bull's eye pattern of circular concentric grooves produce a monochromatic beam of collimated light when heated. The plasmonic device can be made from different metals such as tungsten, gold and silver or other combinations of materials. The wavelength of the emitted light can be tuned by changing the metal and the spacing of the concentric grooves of the bull's eye pattern. The monochromatic light beam produced by the device is low-intensity.

This unique plasmonic device has applications in

- Thermophotovoltaics
- Sensors including temperature and chemical sensing
- Optical signal processing
- Analytical instrumentation

Cost Effective Process to Construct Thin Metal Films

A simple and cost effective process for constructing the thin metal films has also been developed. The process produces films which are extremely smooth which improves the efficiency of the plasmonic wave propagation.

BENEFITS AND FEATURES OF BEAM-PRODUCING PLASMONIC DEVICE:

- Converts thermal energy into light or vice versa
- Produces beams of collimated light that are low-intensity
- Tunable emission from microwave to visible wavelengths
- Improved emission output – narrow, focused beams
- Simple fabrication method

Technology ID

z09085

Category

Engineering & Physical Sciences/Instrumentation, Sensors & Controls
Engineering & Physical Sciences/Materials
Engineering & Physical Sciences/Photonics

View online