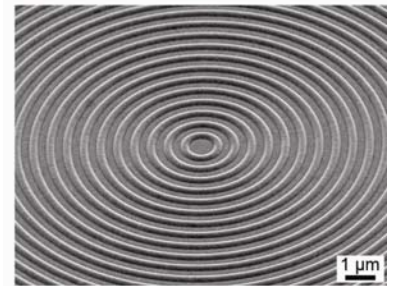




Laser-Like Beam from Metallic Films

Patterned metal films or surfaces can produce surface plasmons (charge density waves) when heated. A unique metal pattern in the shape of a “bull’s eye” can convert thermal energy into a tuned, directional beam of light or visa versa. This is a platform technology with multiple potential applications including:

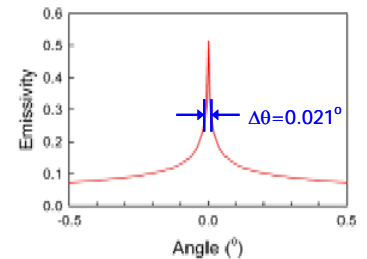
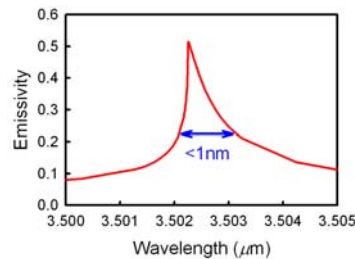
- wireless temperature sensors
- chemical sensing
- thermo-photovoltaics
- monochromatic light source



The wavelength range can be tuned by changing the periodicity of the concentric pattern and the metal used to make the film. A simple and cost effective process for constructing the films has also been developed. The process produces films which are extremely smooth in both the groove and unpatterned surface which improves the efficiency of the plasmonic wave propagation.

Features & Benefits

- Converts thermal energy into light or visa versa
- Tunable emission from microwave to visible wavelengths
- Spectrally narrow beams (<50 nm)
- Small angular divergence (0.02°)
- Simple fabrication method
- Single metal patterned film



Technology Status

Metallic films in Tungsten, Silver and Tantalum with the concentric groove pattern have been built. Testing is on-going to confirm computational models. The Tungsten film when heated to 800°C emits a narrow beam near 3.5 micrometers with an angular resolution of 0.05°.

IP Status

Provisional application filed.

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