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Nanotechnology Fabrication of Nanogaps Metal Films (20130266, Dr. Sang Hyun Oh)

IP Status: Issued US Patent; **Application #:** 14/453,791

Nanofabrication Technique

Metal nanogaps with increased precision and reliability of sub-nanoscale structures can be achieved by using standard procedures for nanofabrication of metal films while adding a unique final step of atomic layer deposition and adhesive-tape based planarization. Using this fabrication technique allows for a final product that has vertically oriented metal-insulator-metal structures through which electromagnetic waves can pass for background-free transmission measurements. This technology can be used to produce low cost and high quality filters and polarizers for laboratory instrumentation.

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Technology ID
20130266

Category
Engineering & Physical Sciences/Instrumentation, Sensors & Controls
Engineering & Physical Sciences/Nanotechnology

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Nanotechnology and Fabrication Limitations

The field of nanotechnology and the exact fabrication of products at the nano level is a hot area of study because of the varied applications such designs provide. By squeezing light through nanogaps in metal films, nonlocal electromagnetic effects and electron tunneling is induced while simultaneously creating extreme field enhancements. However, limitations arise in the fabrication of such research tools because there is no reliable technology able to form nanogaps in structures with high reliability and atomic scale resolution. In order for this nanogap technology to become widely used, a technique for fabrication of nanogaps in metals with higher precision is necessary.

BENEFITS AND FEATURES OF FABRICATION OF NANOGAPS IN MATERIALS:

- Higher precision and reliability of product than current techniques
- Produces low cost, high quality filters and polarizers
- Unique atomic layer deposition and adhesive-tape based planarization step

Phase of Development Process has been demonstrated and nanogaps were characterized

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External Link (www.ece.umn.edu)