

Strongly polarized thermal emission from three-dimensional metallic photonic crystals

J.-H. Lee, W. Leung, K. Constant, K.-M. Ho
Ames Laboratory-USDOE, Ames, Iowa, USA.

High-quality layer-by-layer metallic photonic crystals are achievable by use of soft lithographic process, called two-polymer microtransfer molding [1] and conventional electrodeposition. As a two-layer metallic photonic crystal can exhibit highly enhanced thermal emission peaks near its photonic band edge when an appropriate backplane is added, difficulties in fabricating layer-by-layer metallic photonic crystals are significantly relived. Moreover, by polarization-resolved radiometry, we found that the thermal emission from the crystals is strongly polarized at the normal angle to a surface of the crystals as seen in Fig 1. We will also show that both the position and the polarized angles of the emission peaks can be tuned by adjusting the mutual angle between the orientations of each layer.

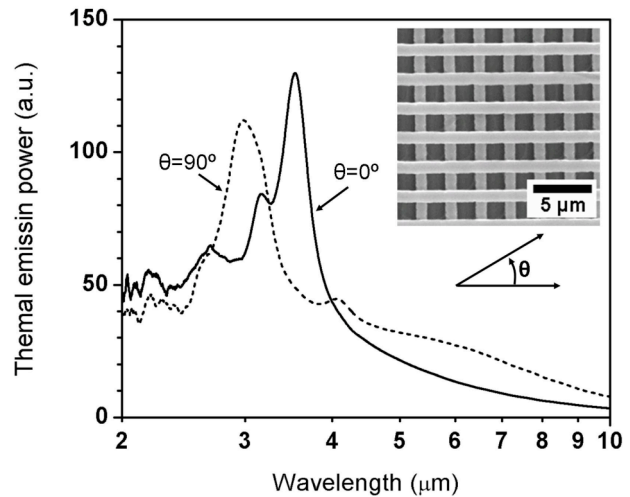


Figure 1. Thermal emission spectra of an orthogonally-aligned metallic photonic crystal at two different polarizing angles.

- [1] J.-H. Lee, C.-H. Kim, K.-M. Ho, and K. Constant, *Adv. Mater*, **17**, 2481 (2005).