

Light Transmission through Metallic Films Coated with Corrugated Dielectric Layers

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Light beams cannot transmit optically thick metallic films. However, if perforated with an array of holes metallic films show enhanced subwavelength light transmission [1]. It is generally believed that the excitations of coupled surface plasmon-polaritons (SPPs) are responsible for such extraordinary light transmission.

We show theoretically that enhanced light transmission can also occur for flat metallic films coated with periodically corrugated dielectric layers on both sides [2]. Over the same metallic films without coatings, transmission is enhanced by several orders of magnitude. Enhanced transmission is found to stem from the excitations of the coupled SPPs at the metallic films due to the existence of the periodically corrugated dielectric layers. Our results indicate that flat metallic films or surfaces coated with corrugated dielectric coating layers manifest a promising plasmonic system.

- [1] T. W. Ebbesen, *et al.*, Nature (London) **391**, 667 (1998).
- [2] D. Z. Han, *et al.*, Appl. Phy. Lett. **89**, 091104 (2006).