Fabrication of Large Area Plasmonic Grating using Laser Interference

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Plasmonic-based device offers novel range of applications in optoelectronics. It allows strong coupling between light and surface plasmon polaritons (SPPs) meanwhile different methods to improve light-matter interaction have been recently the focus of many studies. In present study, we fabricated large area, 10 x 10 mm2, ruled grating in the metal/dielectric interface that has enhanced plasmonic coupling efficiency. It is more efficient than planer metal/dielectric interface, which cannot optimally excite the light because of weak coupling between incident light and resonant surface modes. The grating pattern in the interface is fabricated through photolithography technique using optical interference method on photosensitive layer, followed by metal. We applied the large area grating pattern on the top of photonic cavity to measure cavity mode-SPP coupling and confirmed Anti-crossing on the reflection light measurement. The grating function at the metal/dielectric interface to improve cavity mode-SPP coupling was quite acceptable; in addition, anti-crossing was explicitly observed.