THE EXTRAORDINARY TRANSMISSION OF SUBWAVELENGTH METALLIC ARRAYS: IR SPECTRA OF A SELF-ASSEMBLED PHOSPHOLIPID BILAYER VERSUS TEMPERATURE

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We recently discovered that commercial Ni microarrays have surface plasmon mediated transmission resonances throughout the infrared region. These meshes were electrochemically coated with Cu to make the resonances narrower and to enable the application of a stable alkanethiolate (1- hexadecanethiolate) self-assembled monolayer. A bilayer was then added of optically active phospholipid, dipalmitoylphosphatidylcholine (DPPC), resulting in a supported trilayer system. Since the surface plasmons run along the surface of the metal, molecular species on the surface experience a large pathlength for absorption. Infrared spectra and polarized optical images were recorded with increasing temperature from 20°C to 100°C.