

MORE THAN A HUNDRED-FOLD ENHANCEMENT IN THE INFRARED ABSORPTION OF MONOLAYERS BY USING METALLIC MICROARRAYS WITH SUBWAVELENGTH APERTURES

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Metallic meshes with arrays of subwavelength apertures show fascinating optical properties including Ebbesen's extraordinary transmission effect⁴. More light is transmitted by these meshes than is incident upon the holes. We have coated these metallic microarrays with a self-assembled monolayer (SAM) of 1-dodecanethiol and recorded FTIR absorption spectra with absolute absorbances of approximately 0.2 (approximately 1/3 of light absorbed on resonance at the CH₂ asymmetric stretch). Literature work using reflection absorption infrared spectroscopy (RAIRS) reports absorbances that vary between 0.002-0.0002 absorbance units. These developments may allow submonolayer coverages of surface species to be studied in direct infrared absorption.

⁴T. W. EBBESEN, H. J. LEZEC, H. F. THIO, and P. A. WOLFF *Nature* **391** (London), (1998).