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Surface Plasmon Optical Transmission Sensors

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Periodic nanohole arrays in Au films have been fabricated by Ga focussed ion beam patterning. Extraordinary optical transmission is observed with resonances at specific frequencies determined by the array hole spacing. The most widely held explanation is that surface plasmon resonances are essential for this behavior. We have further shown that the transmission can be polarized and tuned depending on the shape of the holes. Raman scattering of adsorbed molecules and spontaneous emission from semiconductor quantum dots coupled to the Au arrays is enhanced by as much as two orders of magnitude. Arrays have been fabricated on glass or plastic insulators making them potentially useful for biosensors in microfluidics applications where transmission mode geometries may be preferable. In collaboration with: Alex Brolo, and Reuven Gordon, University of Victoria.