Supporting Information

Improving the sensing performance of double gold gratings by oblique incident light

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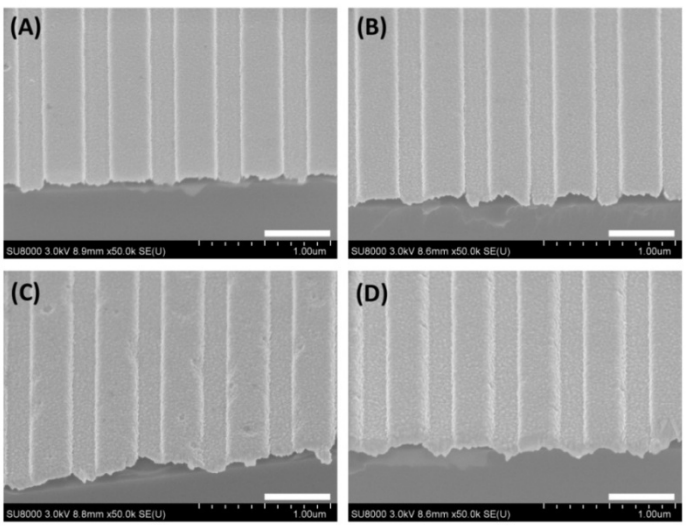

Figure S1. Titled-view (45°) SEM images of S1-S4 corresponding to (A)-(D). Scale bar: 500 nm.

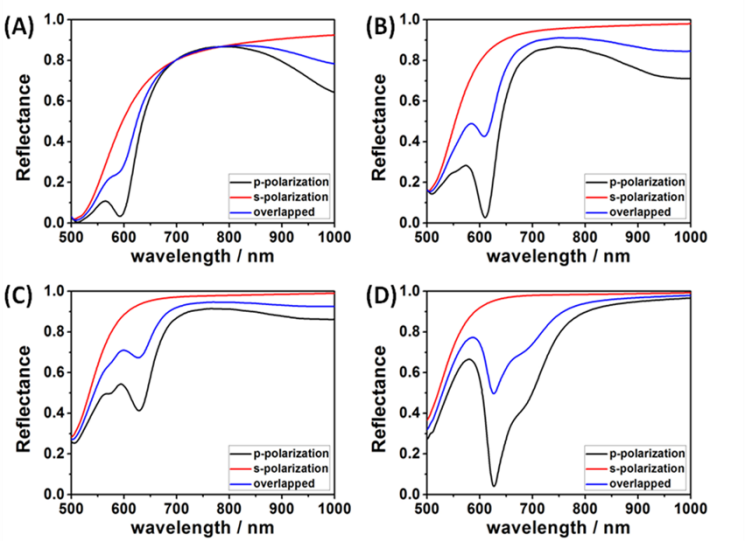

Figure S2. Simulated spectra of the double gratings with the gold thickness of (A) 23 nm, (B) 44 nm, (C) 65 nm and (D) 92 nm. The black curves stand for the p-polarized light and the red curves stand for the s-polarized light. The blue curves are the overlapped spectra.

We simulated the spectra with p- and s- polarized light for the sharp edge and rounded edge, respectively. We assumed that the spectra with different polarized lights contributed the same as the contribution of the non-polarized light. So we got the spectra under non-polarization by overlapping the spectra under different polarizations.

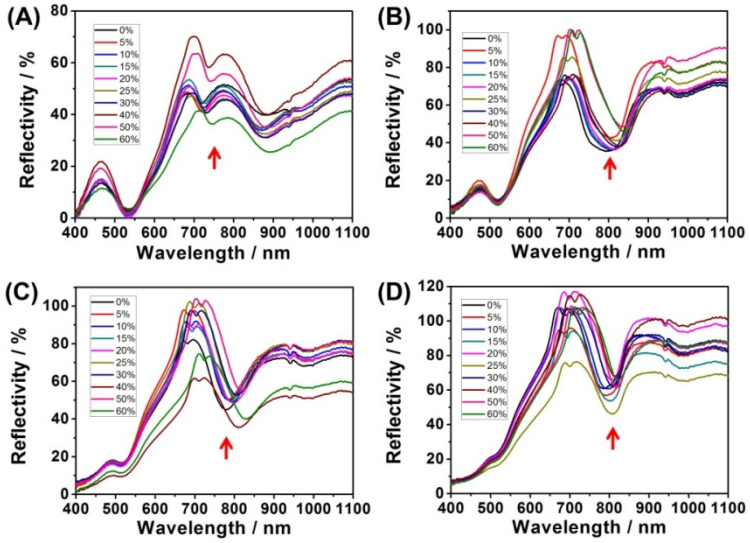

Figure S3. (A-D) Reflection spectra of sample S1-S4 at normal light, the concentrations of the sucrose aqueous solutions range from 0% to 60%. The red arrow stands for the SPR dip.

The resonant wavelength red-shifts when the refractive index of the surrounding medium near the gold surface increases according to $\lambda_{SPR}(n,i)=\frac{P}{i}\mathrm{Re}\{(\frac{\varepsilon_m n^2}{\varepsilon_m+n^2})^{1/2}\}$. When the concentrations of the sucrose aqueous solutions increased, the wavelengths of Fano resonances were red-shifted.

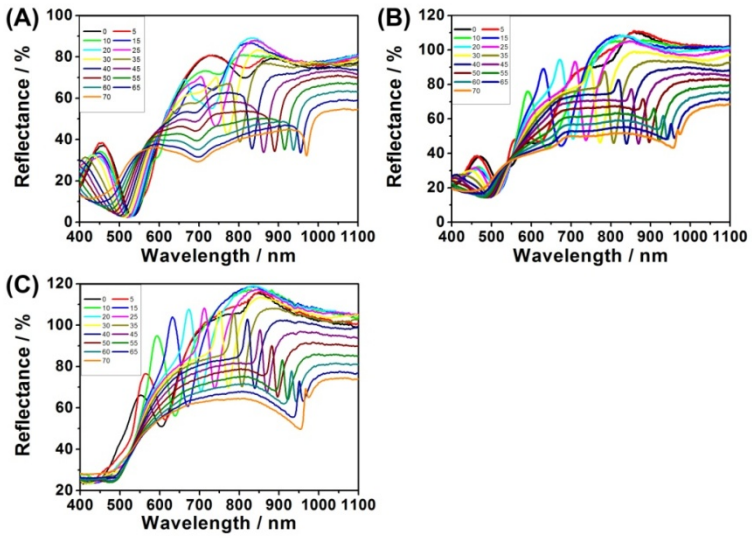

Figure S4. (A-C) Reflection spectra of sample S1, S2 and S4 in air with different incident angles.

At the air/liquid interface, light intensity decreases with the increasing of incidence angle, which leads to the decrease of the reflectivity.