Supporting information

Multifunctional Si_3N_4 nanobrick metasurface for sensing

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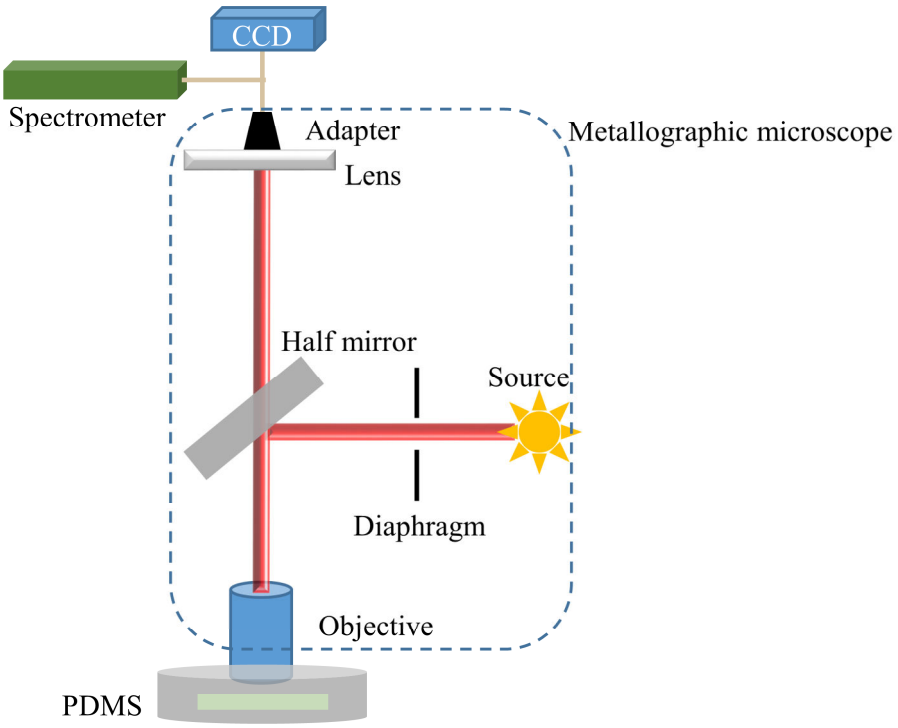

Fig. S1 Schematic diagram of the experimental measurement setup. A 5× microscope objective lens is chosen for observing.

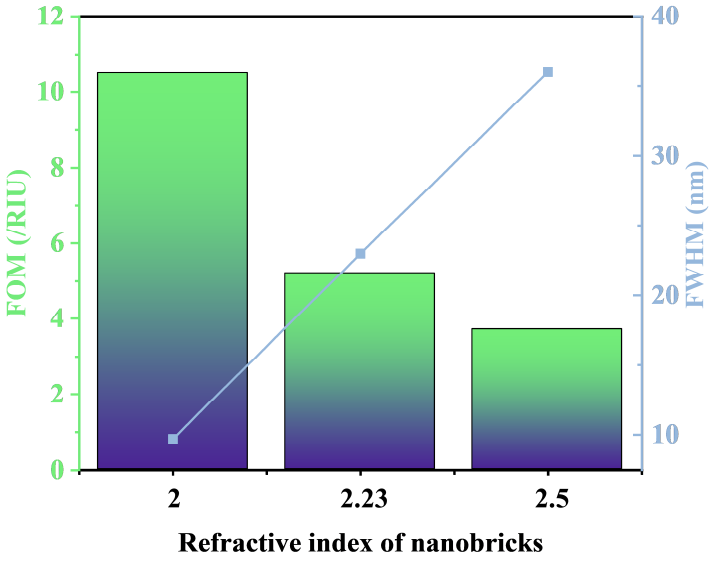

Fig. S2 FOM and FWHM of dielectric metasurfaces with nanobricks with different refractive indices changing from $n = 2$ to $n = 2.5$. P and H are 360 nm and 350 nm, respectively. The duty cycles (f) of nanobricks with $n = 2$, 2.23, and 2.5 are 0.6, 0.52, and 0.45, respectively.

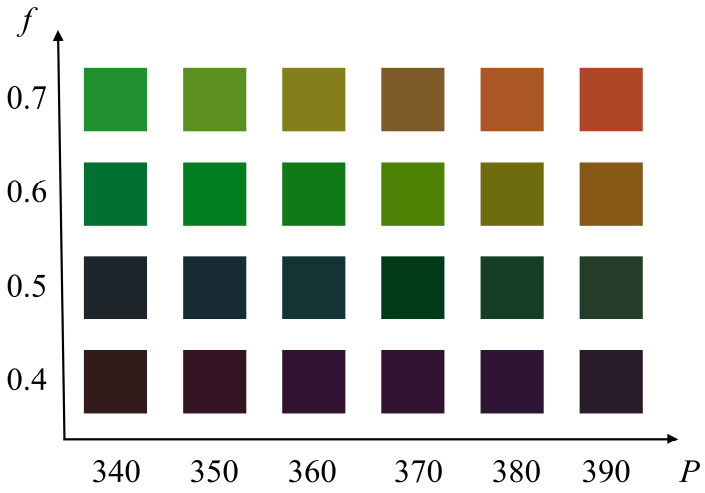

Fig. S3 Reflected colors of Si_3N_4 metasurfaces based on numerical simulations with different structural parameters. The simulated environment is air.

Table S1 Results of the energy dispersive spectrometer.

	Element	C	N	Si	O	Total
bare Si_3N_4 metasurafce	Weight percentage (%)	0	58.10	30.30	11.61	100
metasurafce/silane-PEG-COOH	Weight percentage (%)	23.49	10.09	47.96	18.46	100

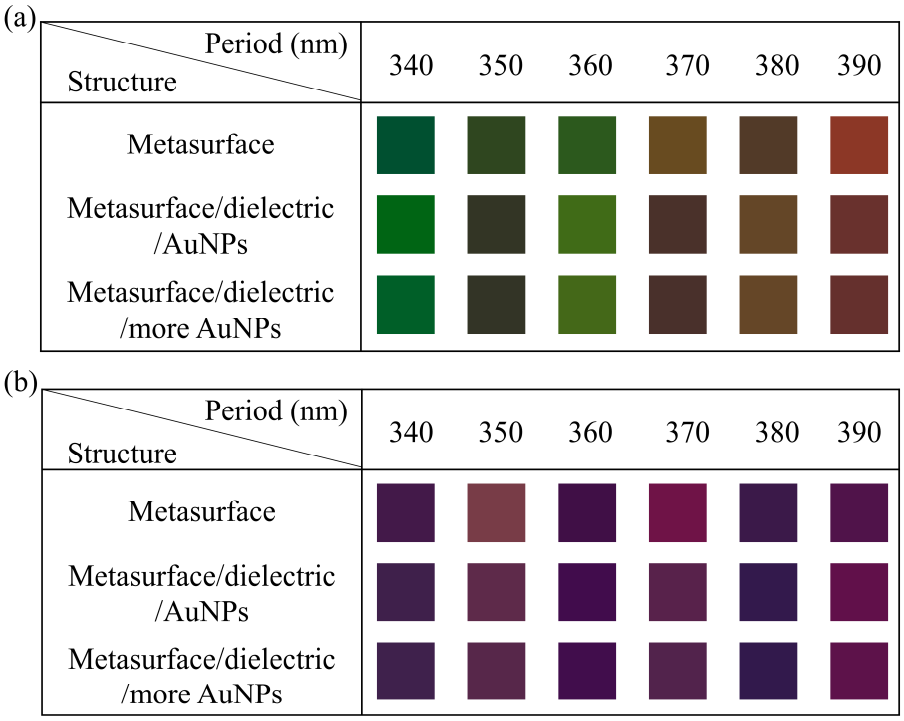

Fig. S4 Colors corresponding to simulated reflection spectra for the Si_3N_4 metasurface, metasurface/dielectric/AuNPs, and metasurface/dielectric/more AuNPs at the periods from 340 nm to 390 nm. The values of duty cycle (*f*) are 0.6, and 0.8 in (a) and (b), respectively. The simulated environment is PBS.

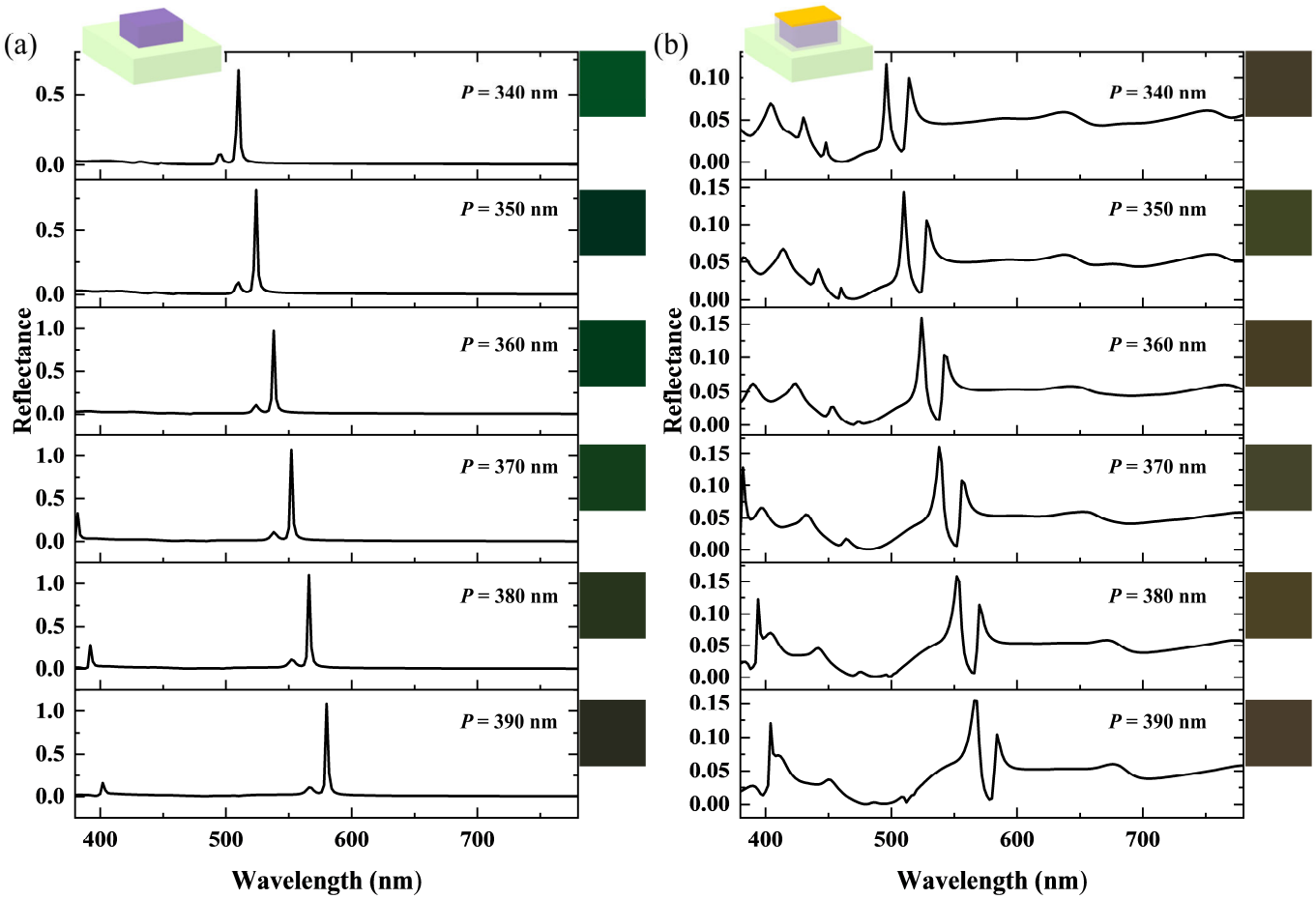

Fig. S5 Reflection spectra with P from 340 nm to 390 nm and $f = 0.5$ for Si_3N_4 metasurface (a) and Si_3N_4/dielectric/GF (b). Insets are the colors corresponding to the reflection spectra. The simulated environment is PBS.

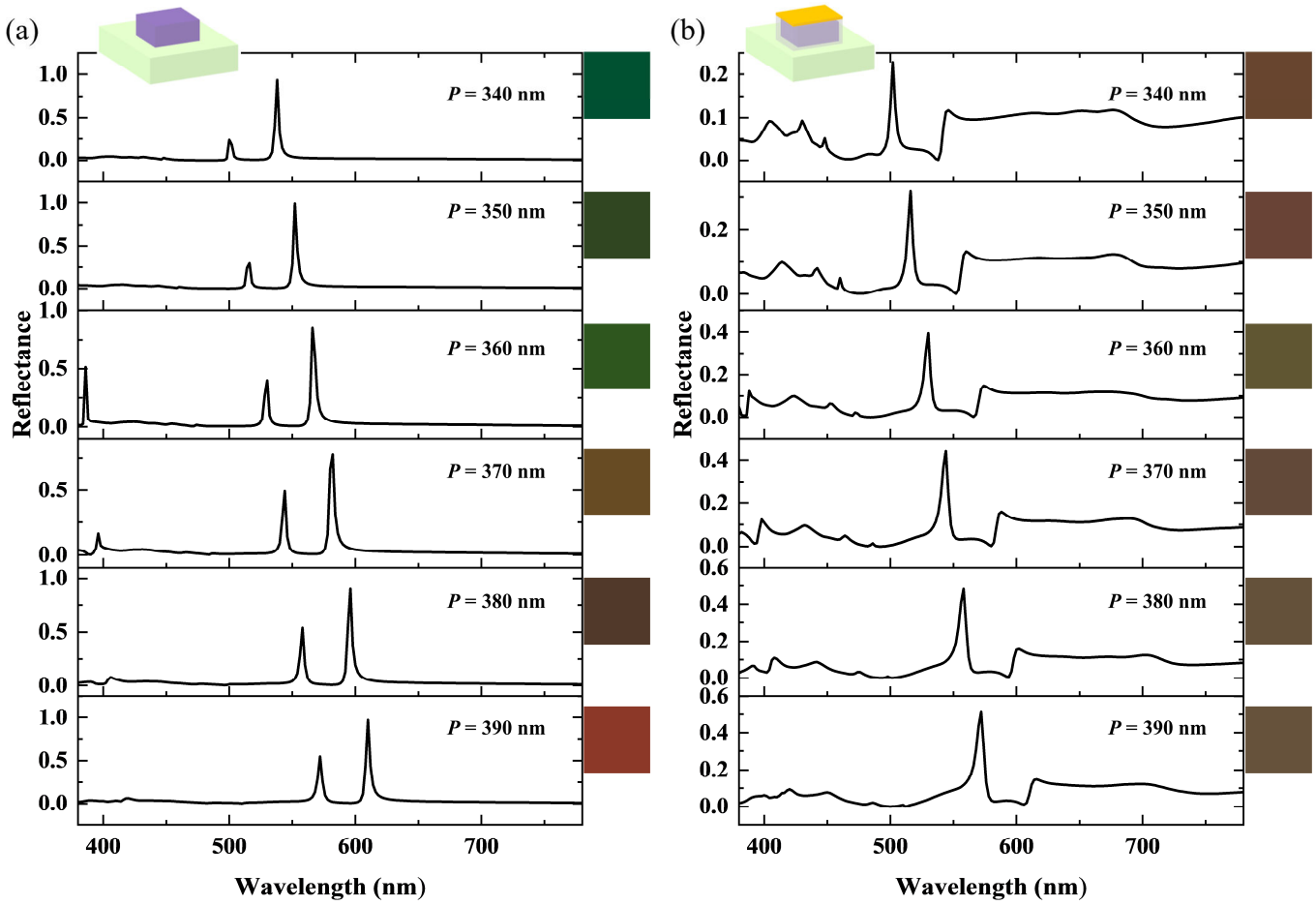

Fig. S6 Reflection spectra with P from 340 nm to 390 nm and $f = 0.6$ for Si_3N_4 metasurface (a) and Si_3N_4/dielectric/GF (b). Insets are the colors corresponding to the reflection spectra. The simulated environment is PBS.

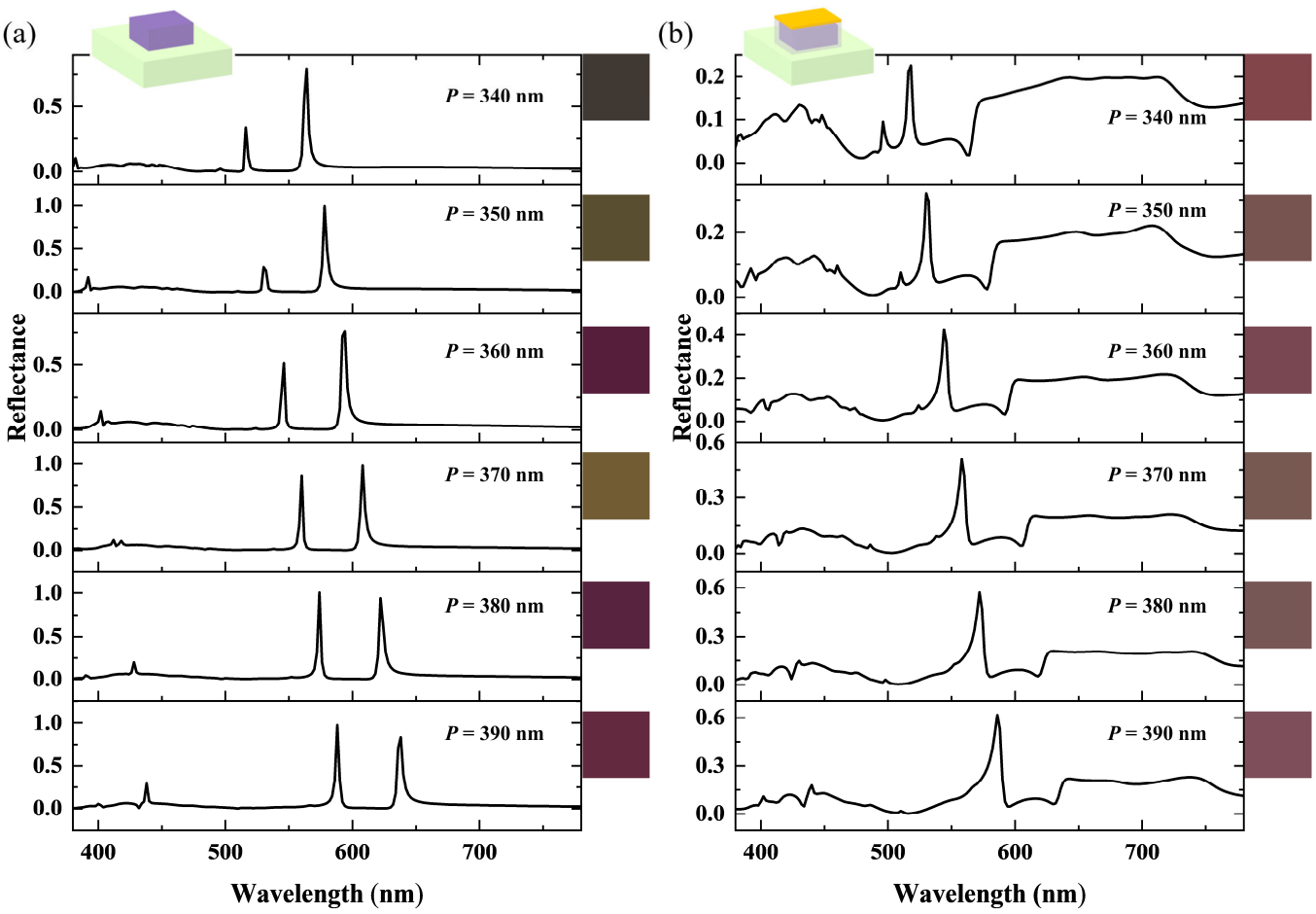

Fig. S7 Reflection spectra with P from 340 nm to 390 nm and $f = 0.7$ for Si_3N_4 metasurface (a) and Si_3N_4/dielectric/GF (b). Insets are the colors corresponding to the reflection spectra. The simulated environment is PBS.