Electronic Supplementary Information (ESI)

Chemical patterning on preformed porous silicon photonic crystals: Towards multiplex detection of protease activity at precise positions

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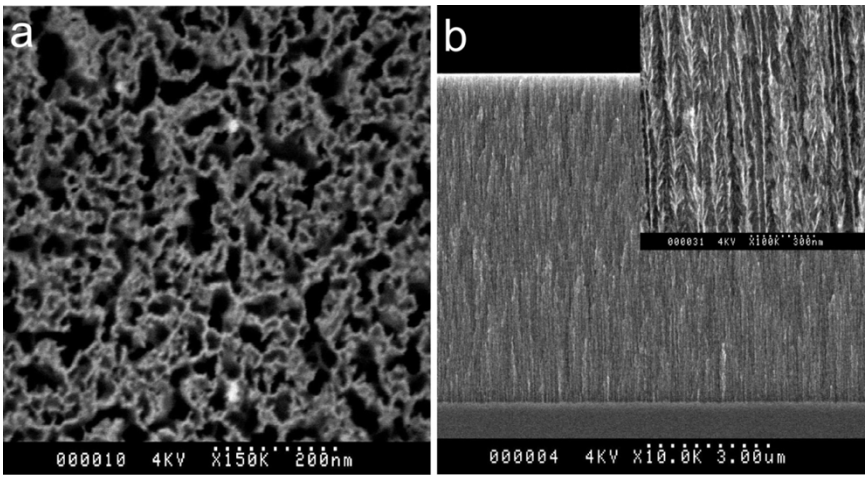

Figure S1. Scanning electron microscopy images of PSi rugate filter. (a) top view of the PSi with an average pore size 40 nm. (b) Cross section view of the PSi with a thickness 8 μm; (insert) PSi cross section view with a higher magnification.

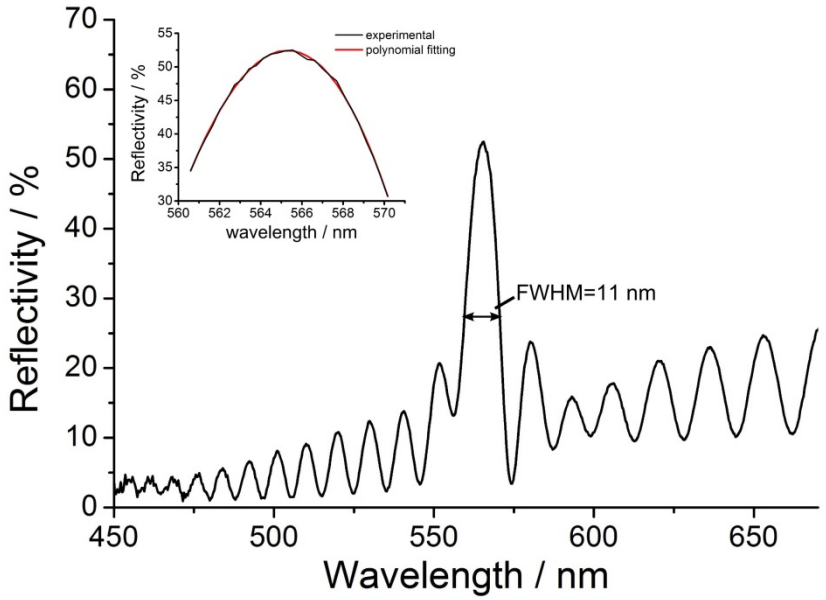

Figure S2. The reflectivity spectrum of a typical PSi rugate filter, which consists of high-frequency small amplitude interference fringes and a single narrow-band high reflectivity Bragg peak. The insert shows the polynomial fitting of the peak, and the peak position was the wavelength corresponding to the maximum intensity after the fitting. For instance, the peak position of the spectrum shown here is 565.2 nm, and the full width at half maximum (FWHM) of the peak is 11 nm.

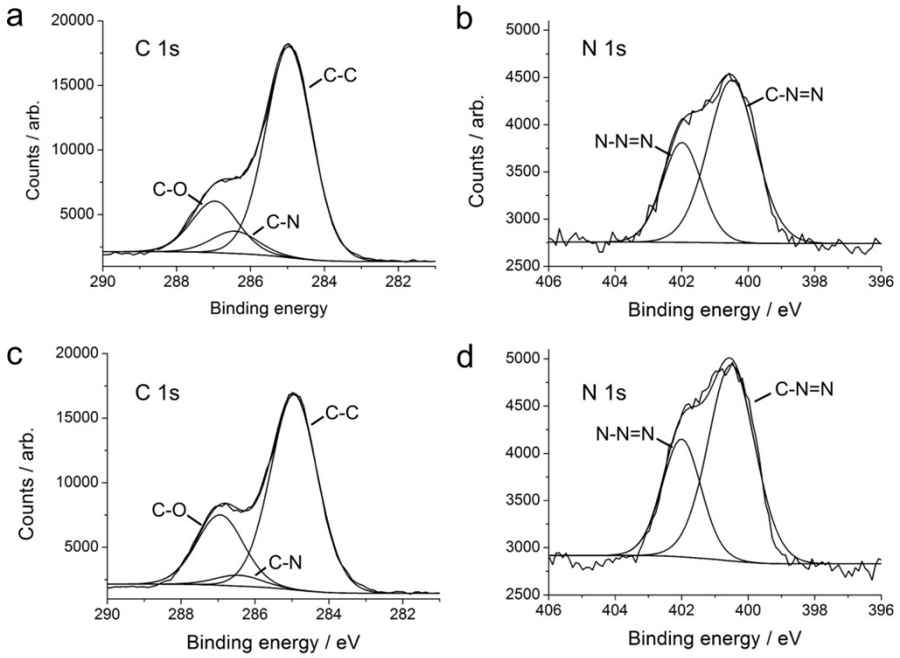

Figure S3. XPS narrow scans of C 1s and N 1s regions for click reaction functionalized PSi surfaces that have undergone the same processes for acquiring the two functionalities on the spot and background regions for the patterning. (a, b) azido-EO_3-Me modified surface that has undergone the following processes which are the same for the background regions in patterning process: 1) alkyne monolayer modification, 2) photoresist spin-coating, 3) UV light exposure, 4) development using 400K developer, 5) click reaction with azido-EO_3-OCH_3, 6) photoresist removal. (c, d) azido-EO_3-OH modified surface that has undergone the following processes which are the same for the spot regions in patterning process: 1) alkyne monolayer modification, 2) photoresist spin-coating, 3) 400K developer rinsing, 4) photoresist removal, 5) click reaction with azido-EO_3-OH.

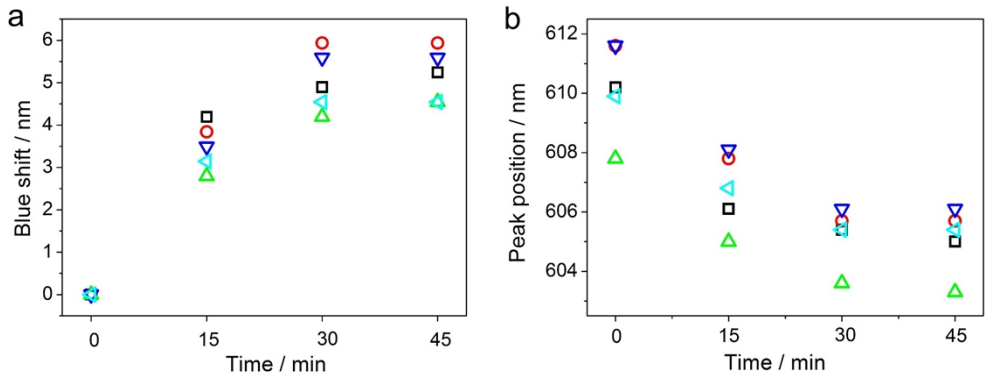

Figure S4. Examples of optical response from 5 array elements of the PSi chip incubated in subtilisin with y-axis presenting either a) blue shifts or b) peak positions.

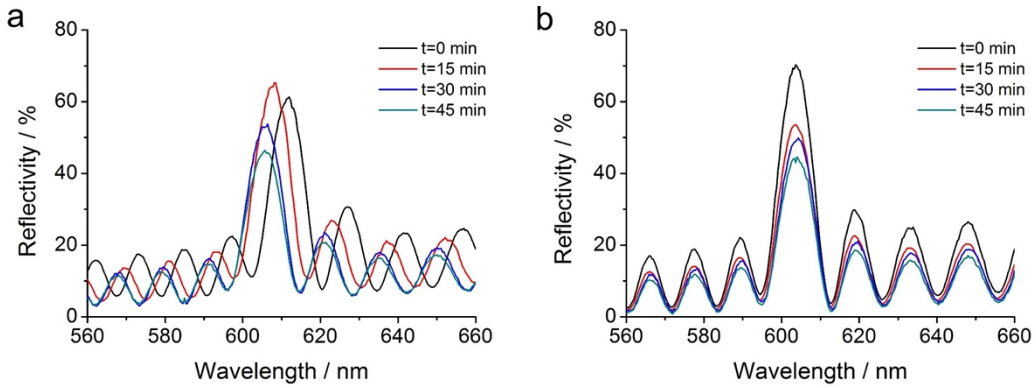

Figure S5. Examples of the spectral shifts with primary spectra from one array element of the PSi chip incubated in a) subtilisin and b) PBS.