Figure S1. XPS spectra of (**A**) the full-scan spectrum; (**B**) Si 2p; (**C**)Ag 3d of SiO$_2$-Ag nanomace arrays.

X-ray photoelectron spectroscopy (XPS) is used to analyze the compositions and chemical bonding states of Ag-SiO$_2$ nanomace arrays in Figure S1. Figure S1A shows the peaks of Ag, Si, C and O elements in the full-scan spectrum. As shown in Figure S1B, the peak of Si 2p at about 103.0 eV can be observed, indicating the formation of the Si-O-Si bond [1]. And the speak of O 1s located at 532.6 eV in Figure S1A, which is consistent with the binding energies for O 1s peaks obtained from SiO$_2$ [2]. Figure S1C shows the two binding energy of Ag 3d $_{5/2}$ and Ag 3d $_{3/2}$, which can be assigned to peak of 368.27 and 374.28 eV, respectively.
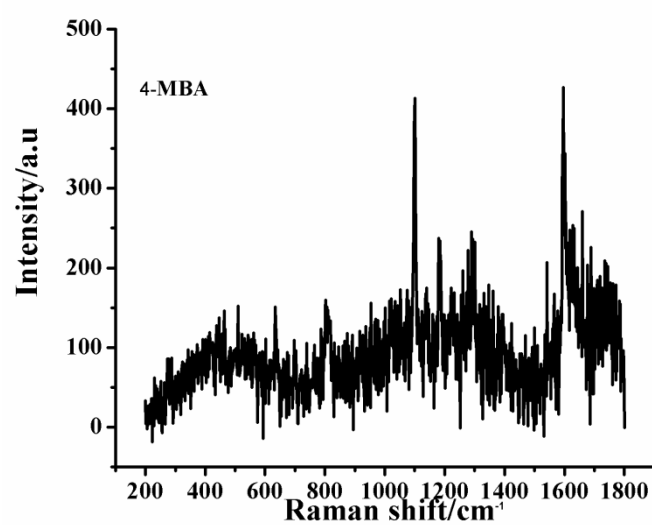
Figure S2. Raman spectra of solid 4-MBA excitation with wavelength was 514.5 nm (40 mW, power out of 1%).