

## Supporting Information

# Chiral Plasmonic Nanowaves by Tilted Assembly of Unidirectionally Aligned Block Copolymers with Buckling-Induced Microwrinkles

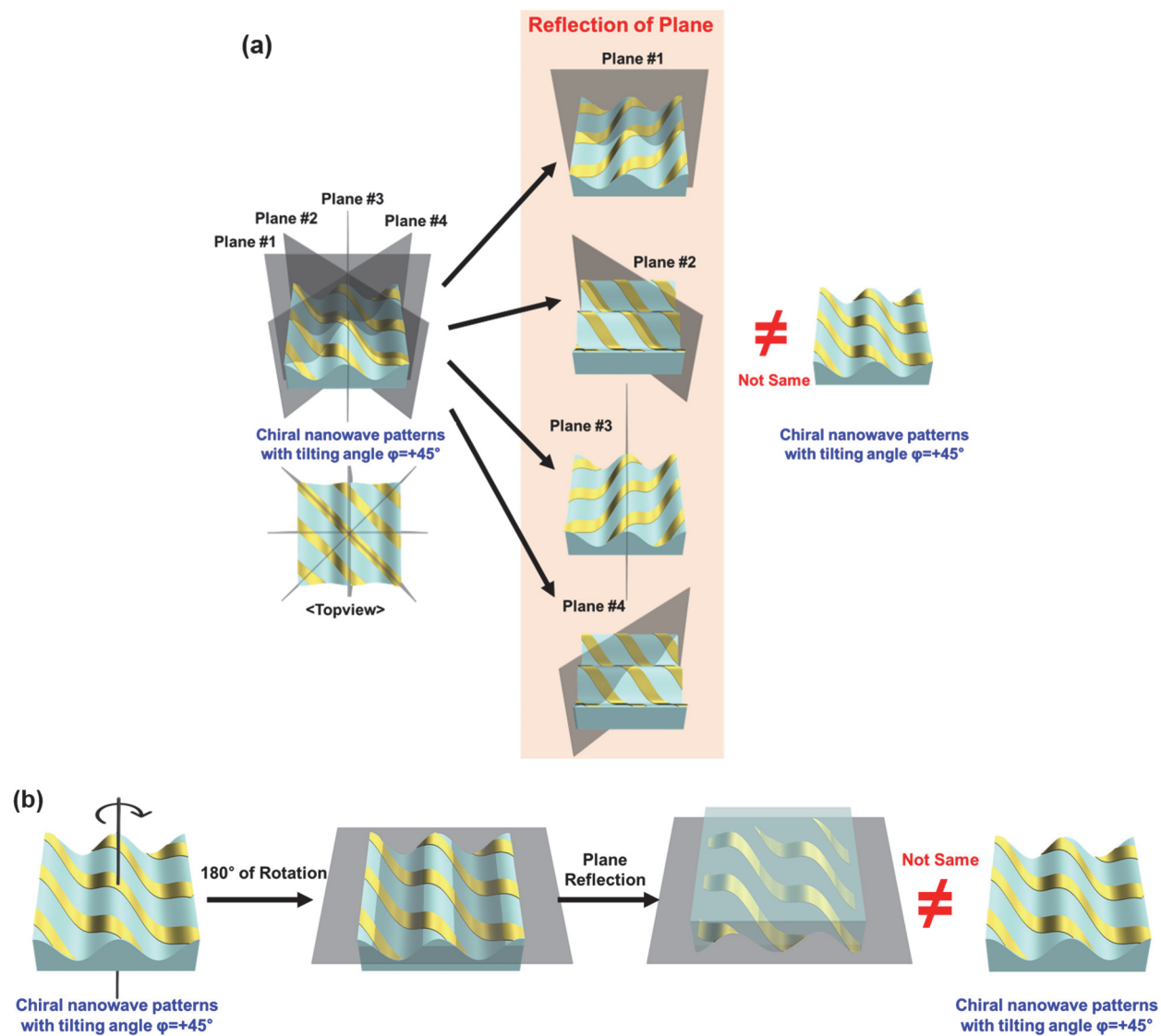
*Junghyun Cho,<sup>†1</sup> Myonghoo Hwang,<sup>†2</sup> Minkyung Shin,<sup>†1,2</sup> Jinwoo Oh,<sup>1</sup> Jinhan Cho,<sup>3,4</sup> Jeong Gon Son,<sup>1,4\*</sup> Bongjun Yeom<sup>2\*</sup>*

<sup>1</sup>Soft Hybrid Materials Research Center, Korea Institute of Science and Technology (KIST), Seongbuk-gu, Seoul 02792, Republic of Korea

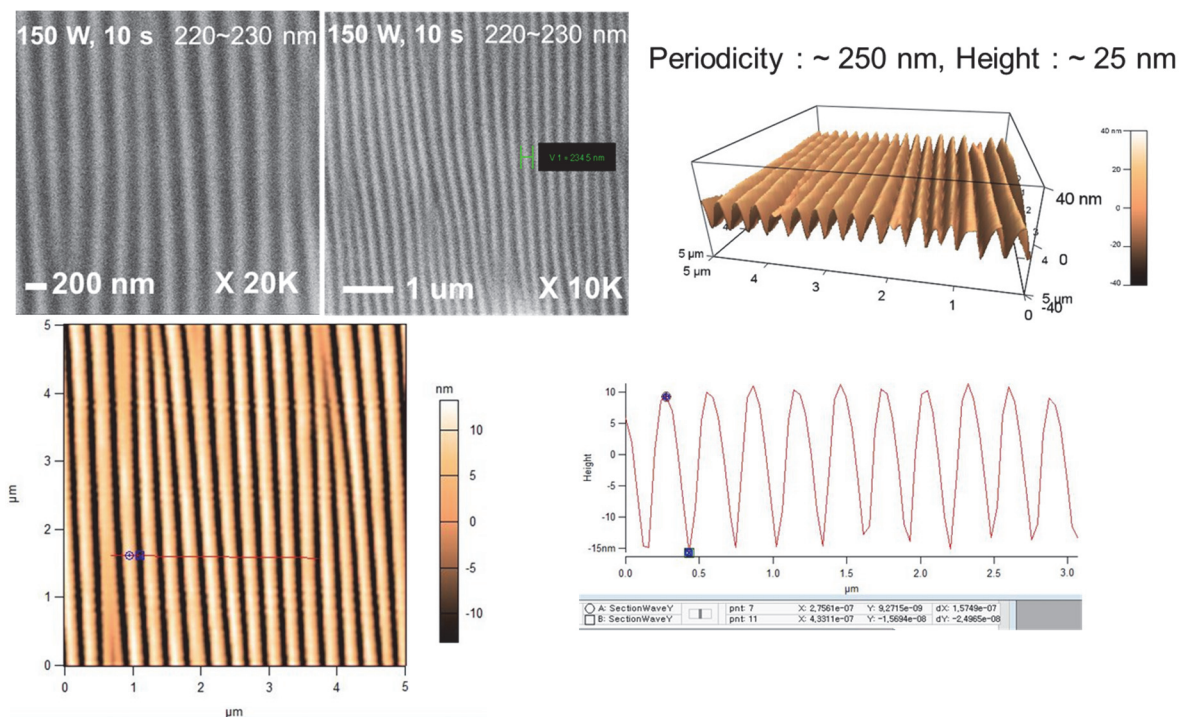
<sup>2</sup>Department of Chemical Engineering, Hanyang University, Seongdong-gu, Seoul 04763, Republic of Korea

<sup>3</sup>Department of Chemical and Biological Engineering, Korea University, Seongbuk-gu, Seoul 02841, Republic of Korea

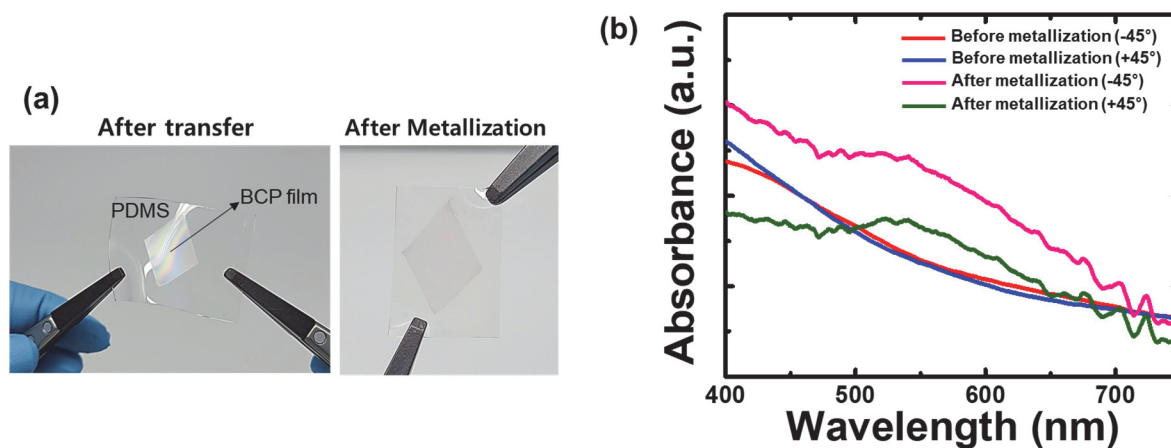
<sup>4</sup>KU-KIST Graduate School of Converging Science and Technology, Korea University, Seongbuk-gu, Seoul 02841, Republic of Korea



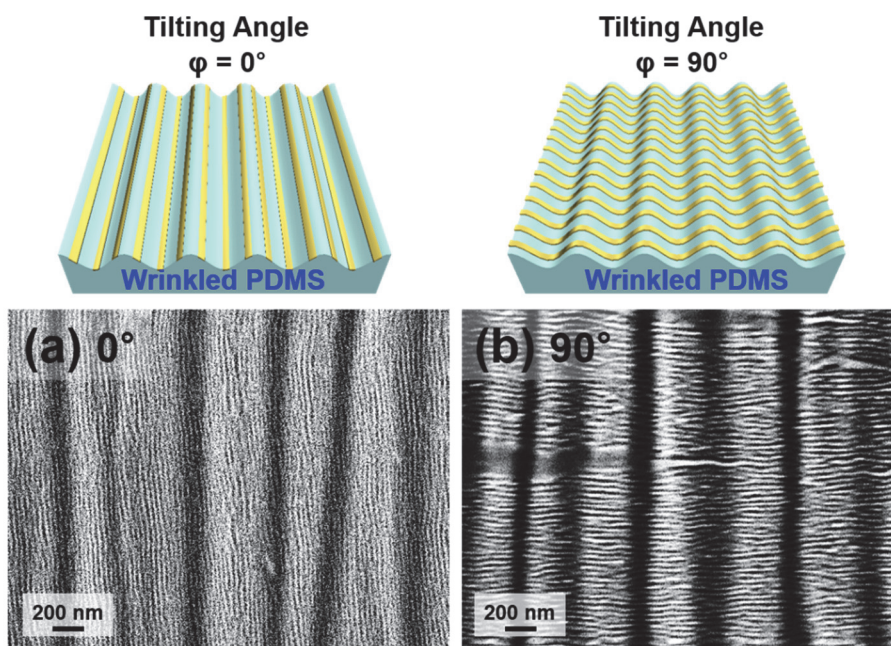
**Figure S1.** Schematic illustrations of the chiral nanowave patterns with tilting angle with  $\varphi = +45^\circ$  for operations of improper ( $S_n$ ) axes of symmetry with (a) the plane symmetry ( $\sigma = S_1$ ) and (b) the inversion symmetry ( $i = S_2$ ).



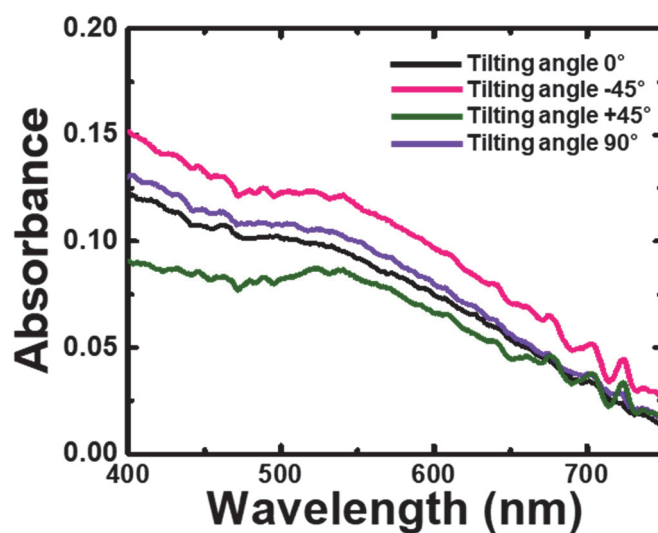
**Figure S2.** SEM and AFM images of wrinkled PDMS substrates under 30% pre-strain with oxygen plasma treatment at 150 W for 10 sec without transferred BCP film.



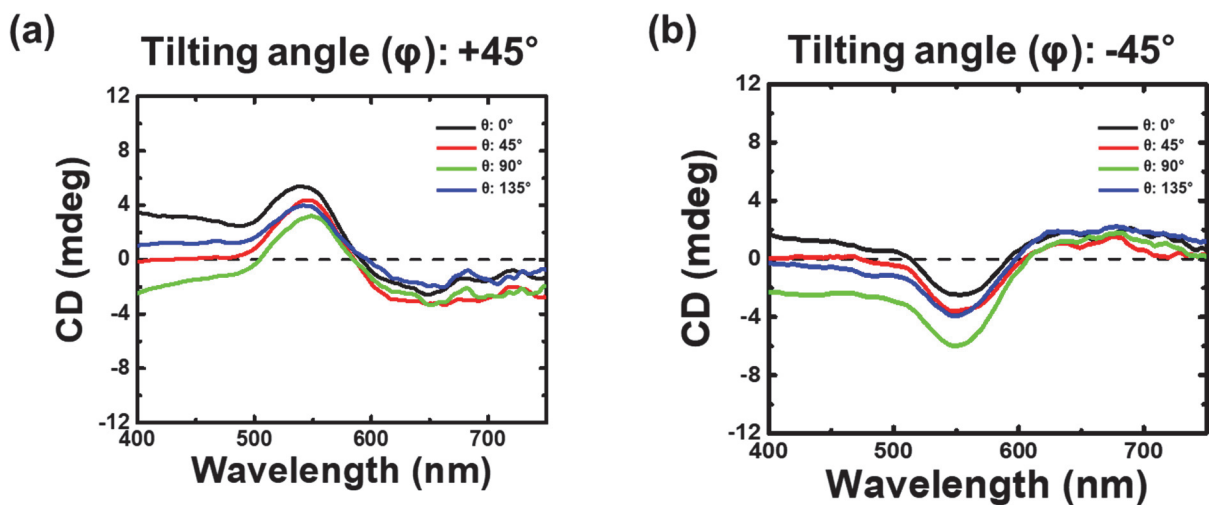
**Figure S3.** (a) Photographs of the samples after transfer and after metallization. (b) UV-Vis absorbance spectra before and after metallization. After metallization, a reddish purple color was observed from the presence of plasmonic absorption; absorbance peaks at ~540 nm support this color change.



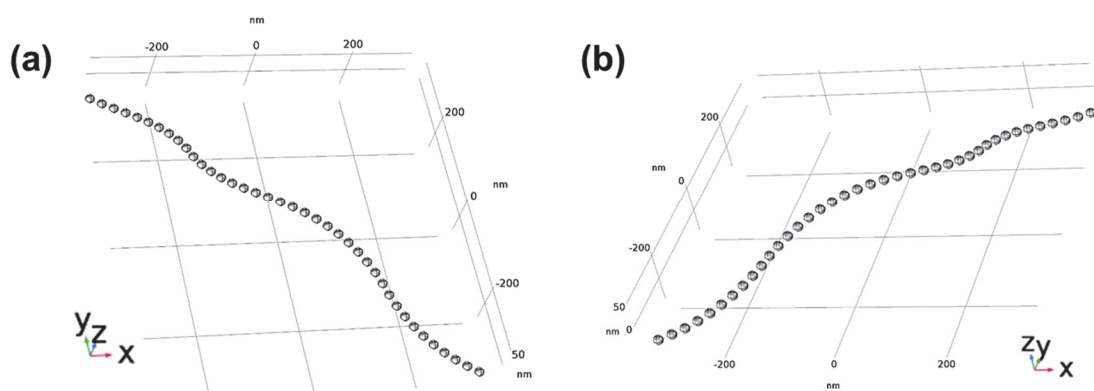
**Figure S4.** Schematics and SEM images of the plasmonic nanopatterns fabricated with tilt angles of (a)  $0^\circ$  and (b)  $90^\circ$ .



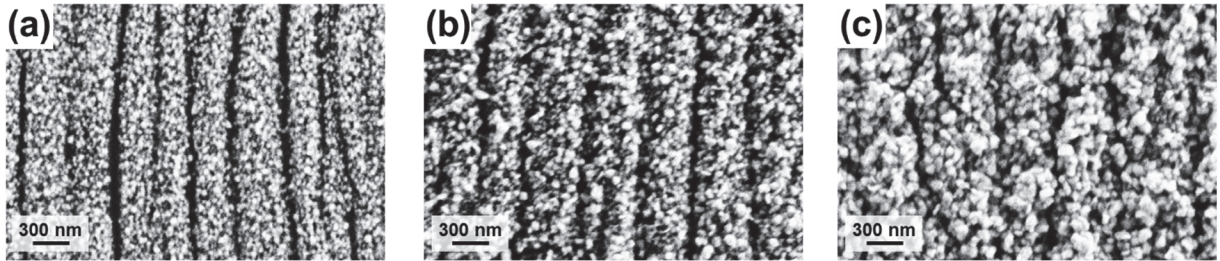
**Figure S5.** UV-vis absorbance spectra of the plasmonic nanopatterns on the micro-wrinkles with various tilt angles.



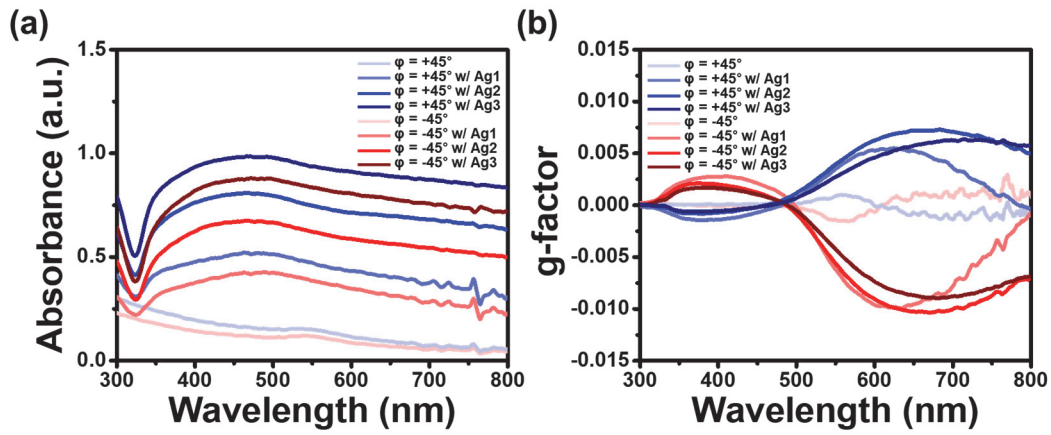
**Figure S6.** CD measured with different azimuthal angles of rotation for the chiral plasmonic nanowave pattern samples fabricated with tilt angles of (a)  $+45^\circ$  and (b)  $-45^\circ$ . Dip-peak shapes of CD spectra are maintained with changes in rotation.



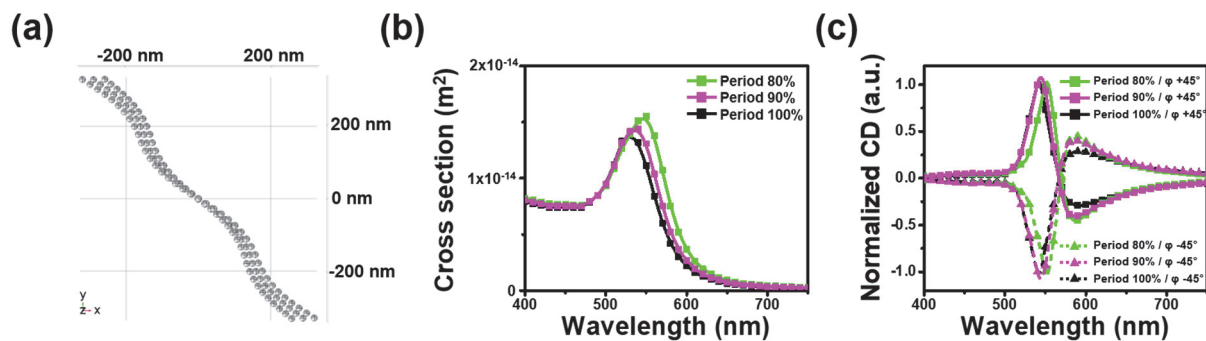
**Figure S7.** Simulated models used for the samples of the tilting angle of (a)  $+45^\circ$  and (b)  $-45^\circ$  in inclined-angle view.



**Figure S8.** FE-SEM images of the chiral plasmonic nanopatterns with  $\phi = -45^\circ$  after (a) first, (b) second, and (c) third silver electroless depositions. Each deposition was proceeded for 10 min.



**Figure S9.** (a) UV-Vis absorbance spectra and (b)  $g$ -factors of the chiral plasmonic nanopatterns before and after the silver electroless depositions.



**Figure S10.** Simulation results with reduction of the microwrinkle periods to 90% and 80% in comparison to the initial model. (a) Simulated models in x-y plane view. (b) Extinction cross-sections. (c) Simulated CD spectra.