Electronic Supplementary Material (ESI) for Nanoscale.

Supplementary Information

Chiral Biosensing at Both Interband Transition and Plasmonic Extinction Regions using Twisted-stacking Nanowire Arrays

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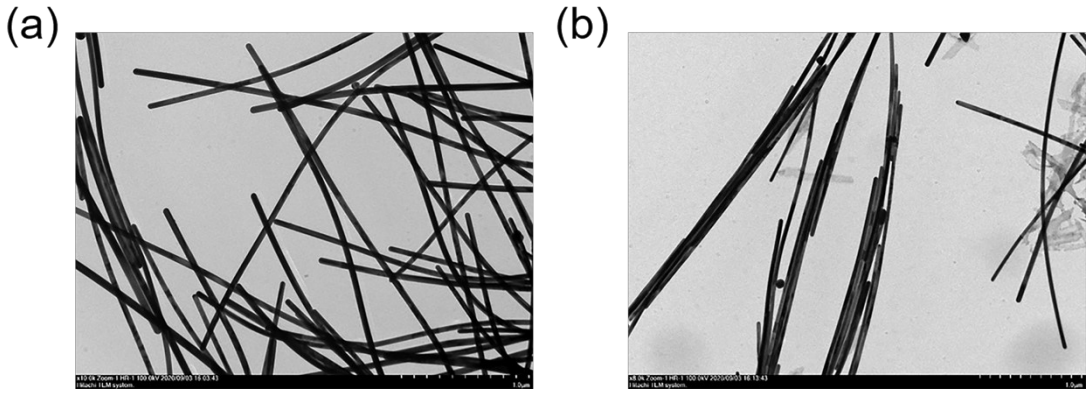

Fig. S1. TEM images of (a) bare-AgNWs and (b) Cys@AgNWs.

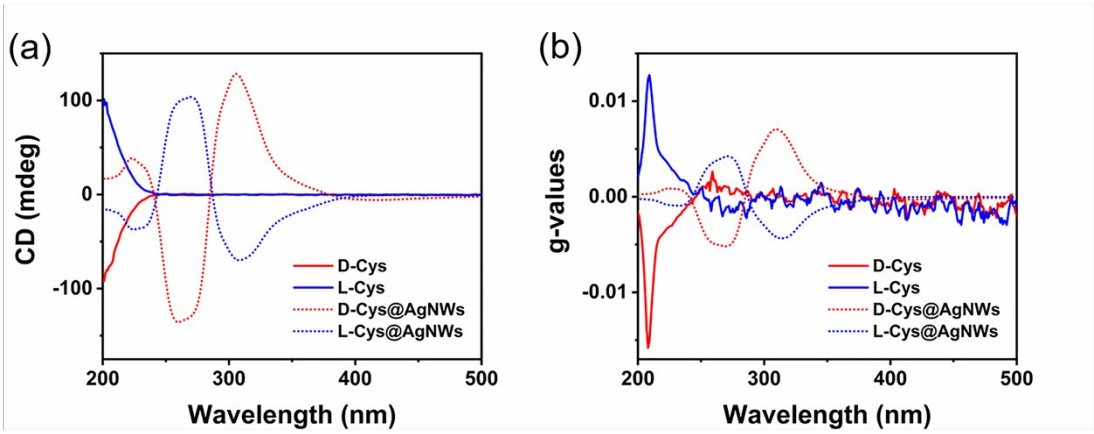

Fig. S2. (a) CD spectra and (b) g-values of L-/D-Cys and L-/D-Cys@AgNWs.

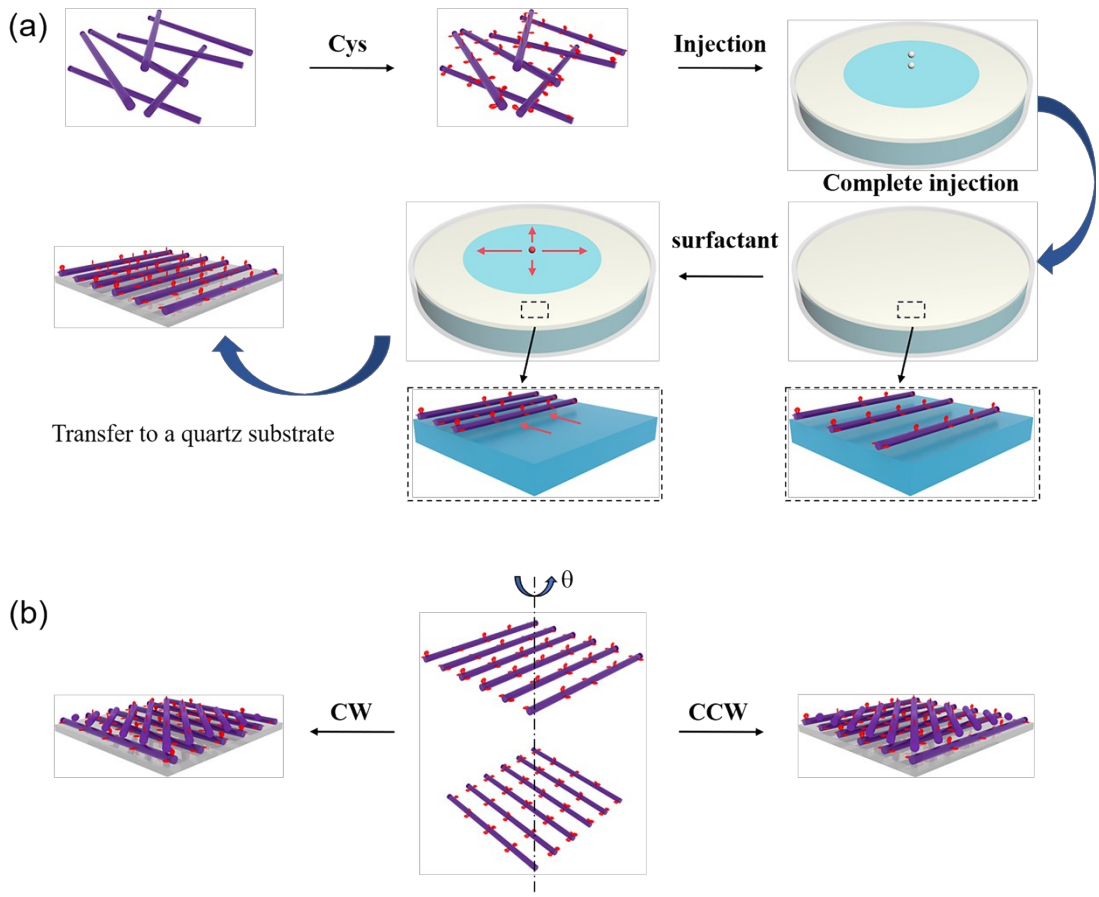

Fig. S3. Illustration of fabricating (a) highly oriented AgNWs single layer. (b) twisted-stacking AgNWs.

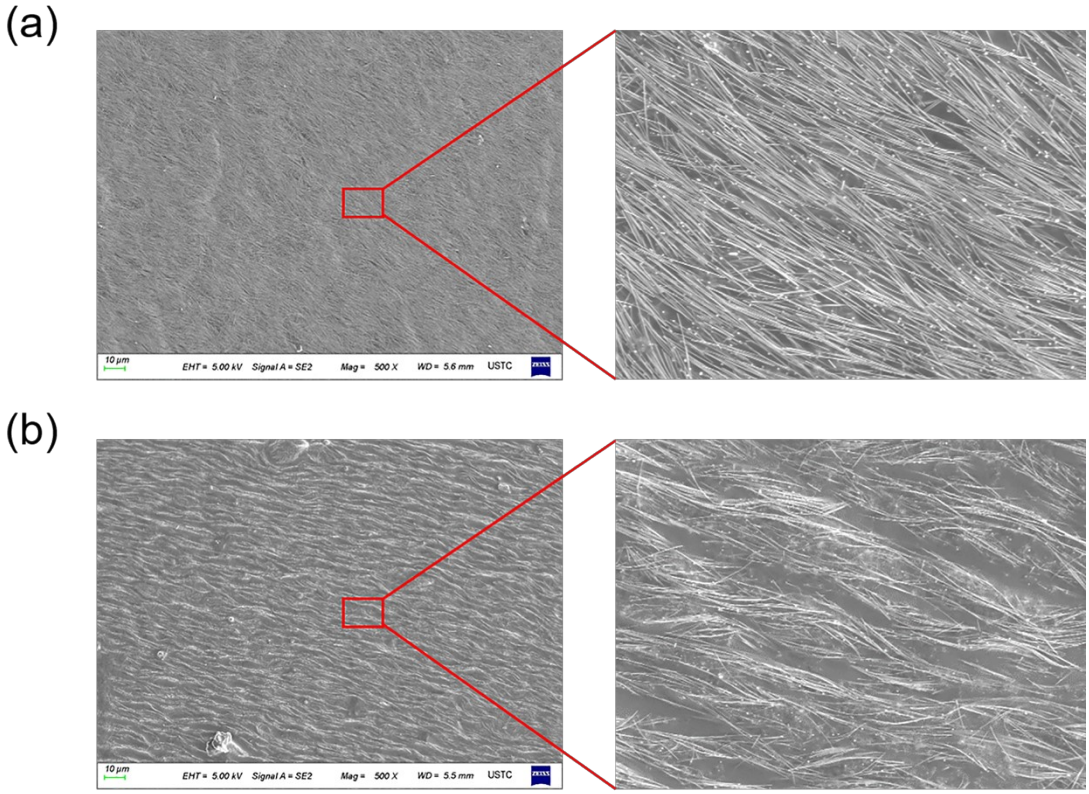

Fig. S4. SEM images of (a) bare-AgNWs and (b) Cys@AgNWs with aligned structures.

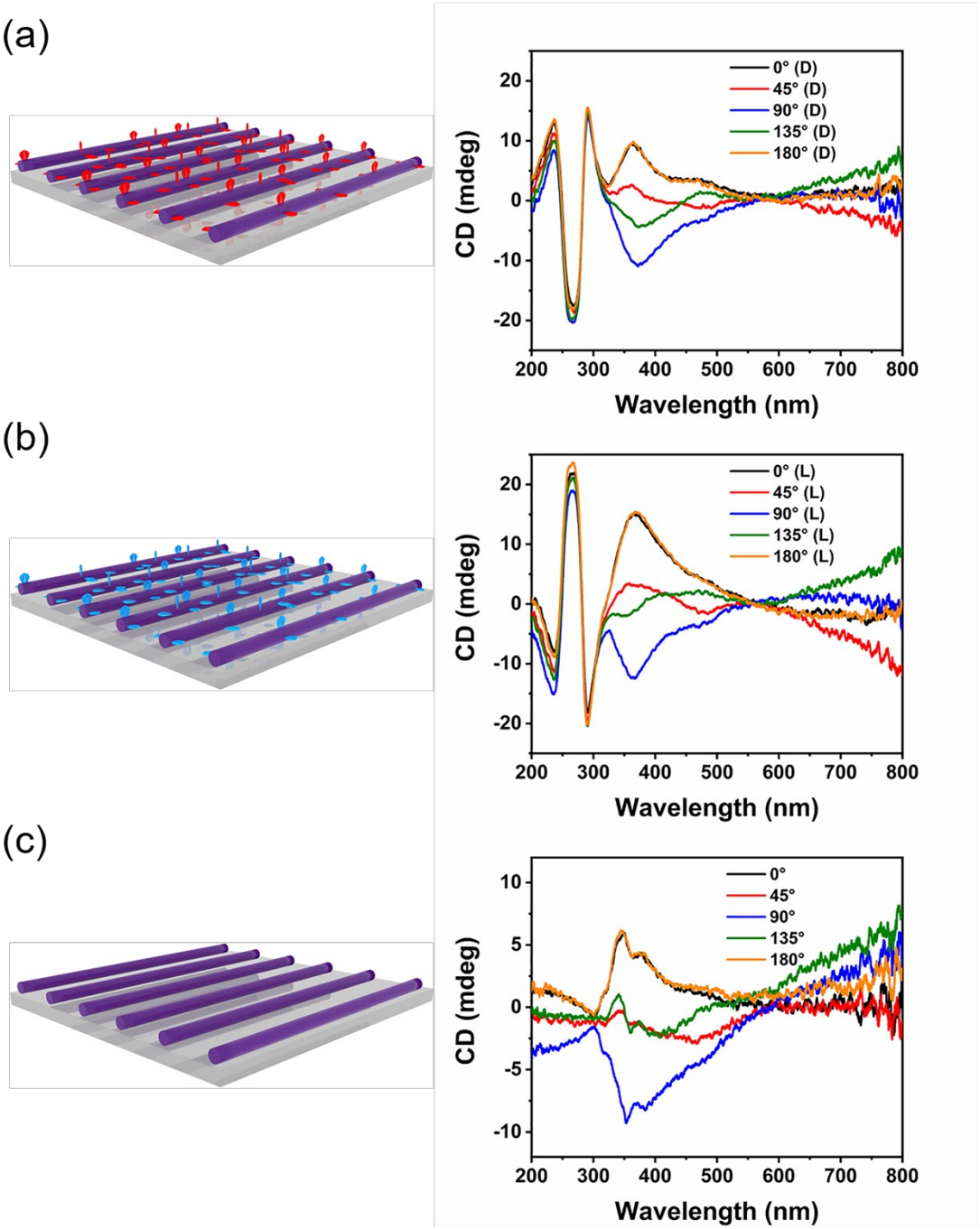

Fig. S5. Schematic diagram and CD spectra of single-layer highly aligned AgNWs films fabricated with (a) D-Cys@AgNWs, (b) L-Cys@AgNWs and (c) bare-AgNWs via Langmuir–Schaeffer technique. When such single-layer of highly oriented Cys@AgNWs was subjected to CD characterization, apparent CD signals could be observed not only at the interband transition region, but also at the plasmonic extinction region (Fig. S4a and 4b). As a reference sample, single-layer of bare AgNWs only exhibited CD signals at the plasmonic extinction region (Fig. S4c). To investigate the origin of the CD signal at the plasmonic extinction region, measurements were carried out by rotating the sample about the normal of the films. The CD signal varied drastically with the rotation angle, thus indicating that such apparent plasmonic CD signals could mostly be attributed to LD and/or LB effects.

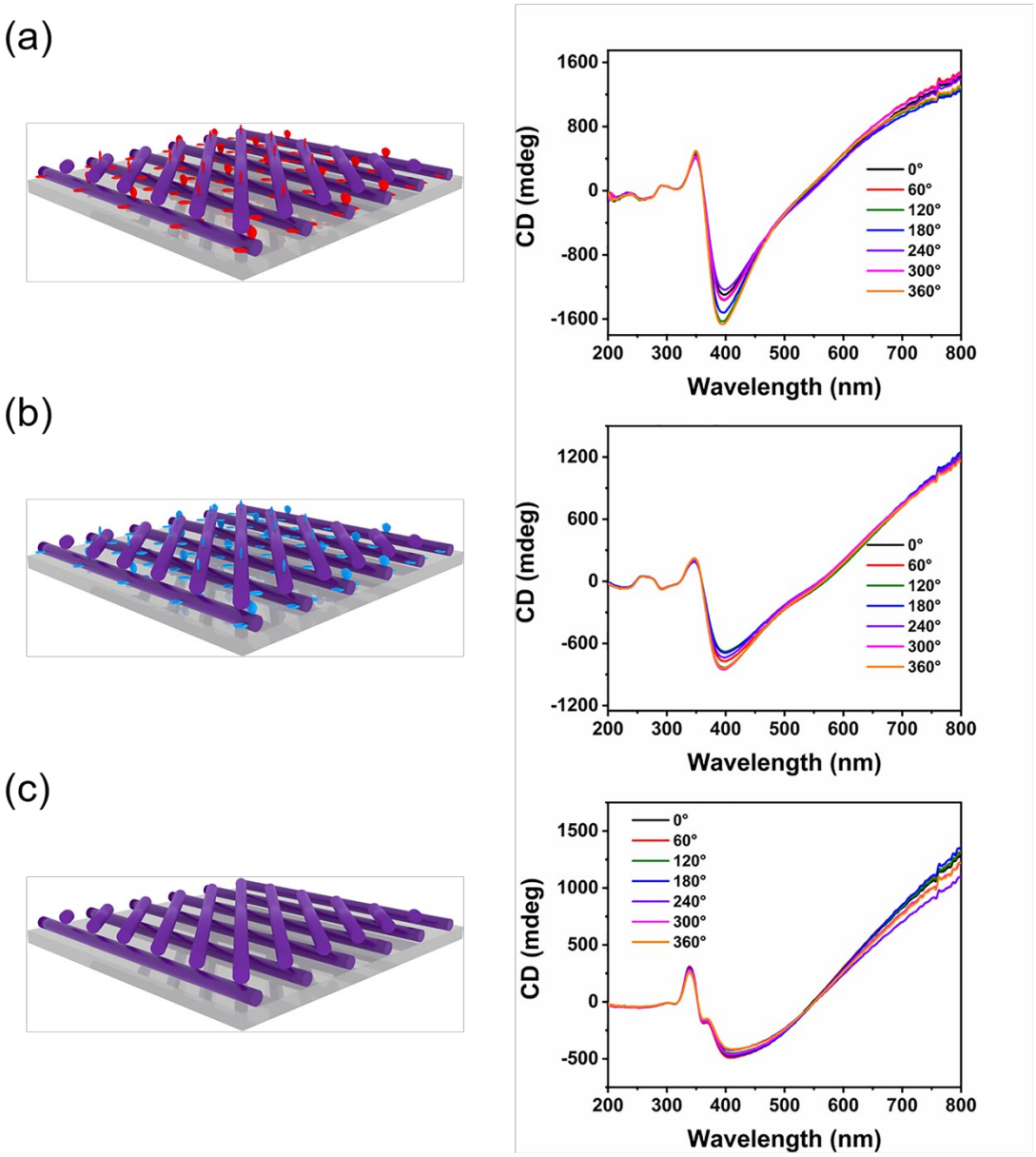

Fig. S6. Schematic diagram and CD spectra of TNA films built by (a) D-Cys@AgNWs, (b) L-Cys@AgNWs and (c) bare-AgNWs. The signal intensity almost invariant with various rotation angle.

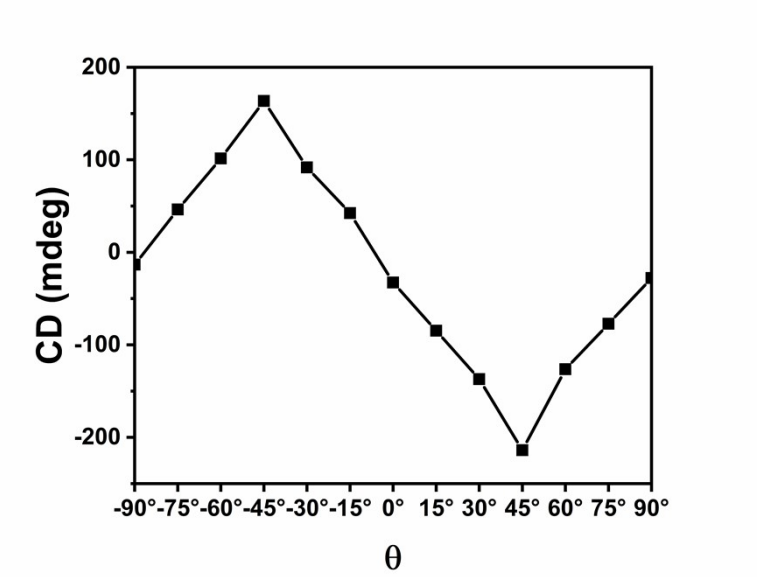

Fig. S7. Intensity and sign of CD signals of TNAs at 410 nm are tuned by the twisted angles.

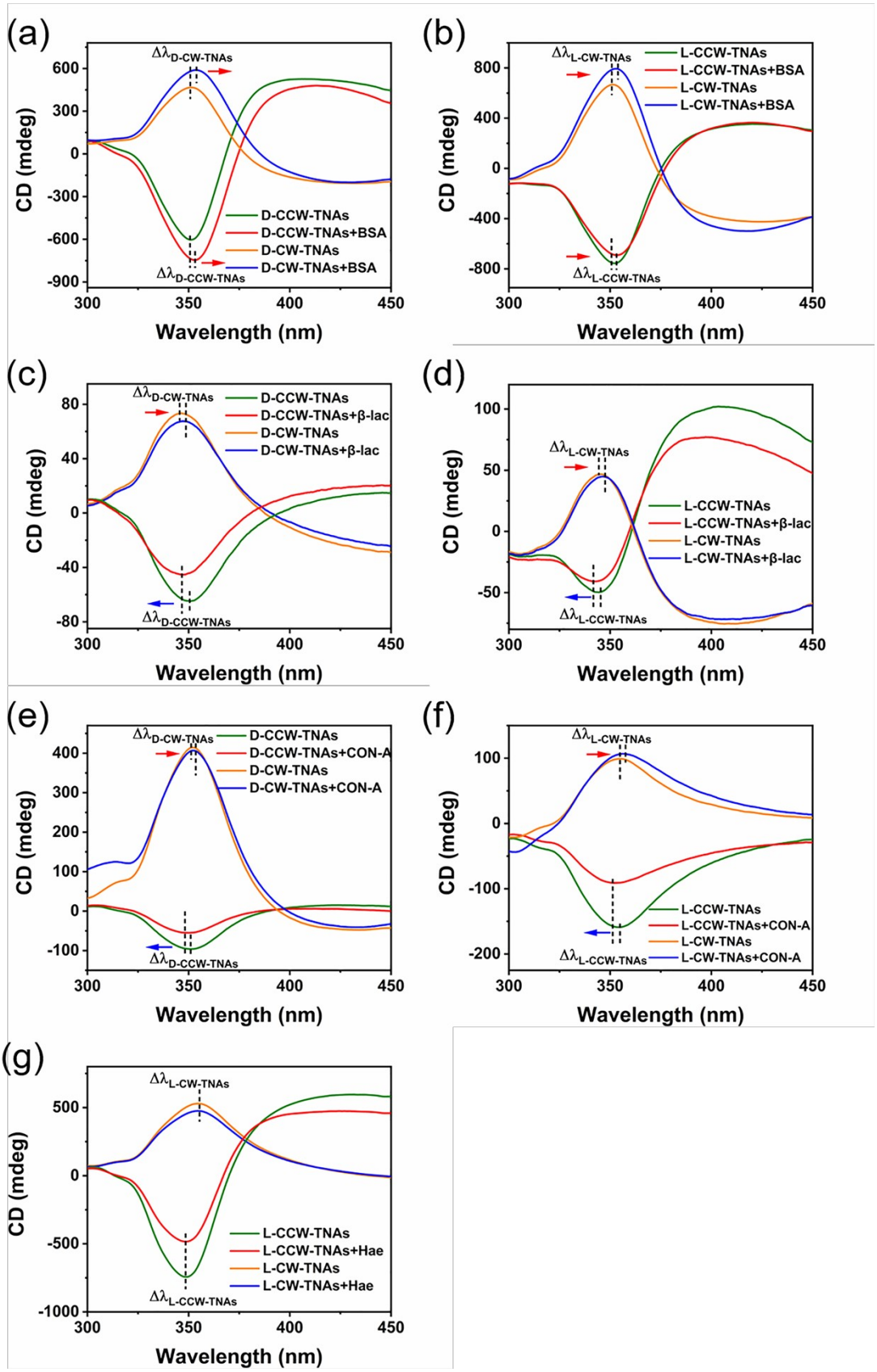

Fig. S8. CD spectra of TNAs at plasmonic extinction region before and after (a) and (b) BSA, (c) and (d) β-lac, (e) and (f) Con-A, (g) Hae adsorption.

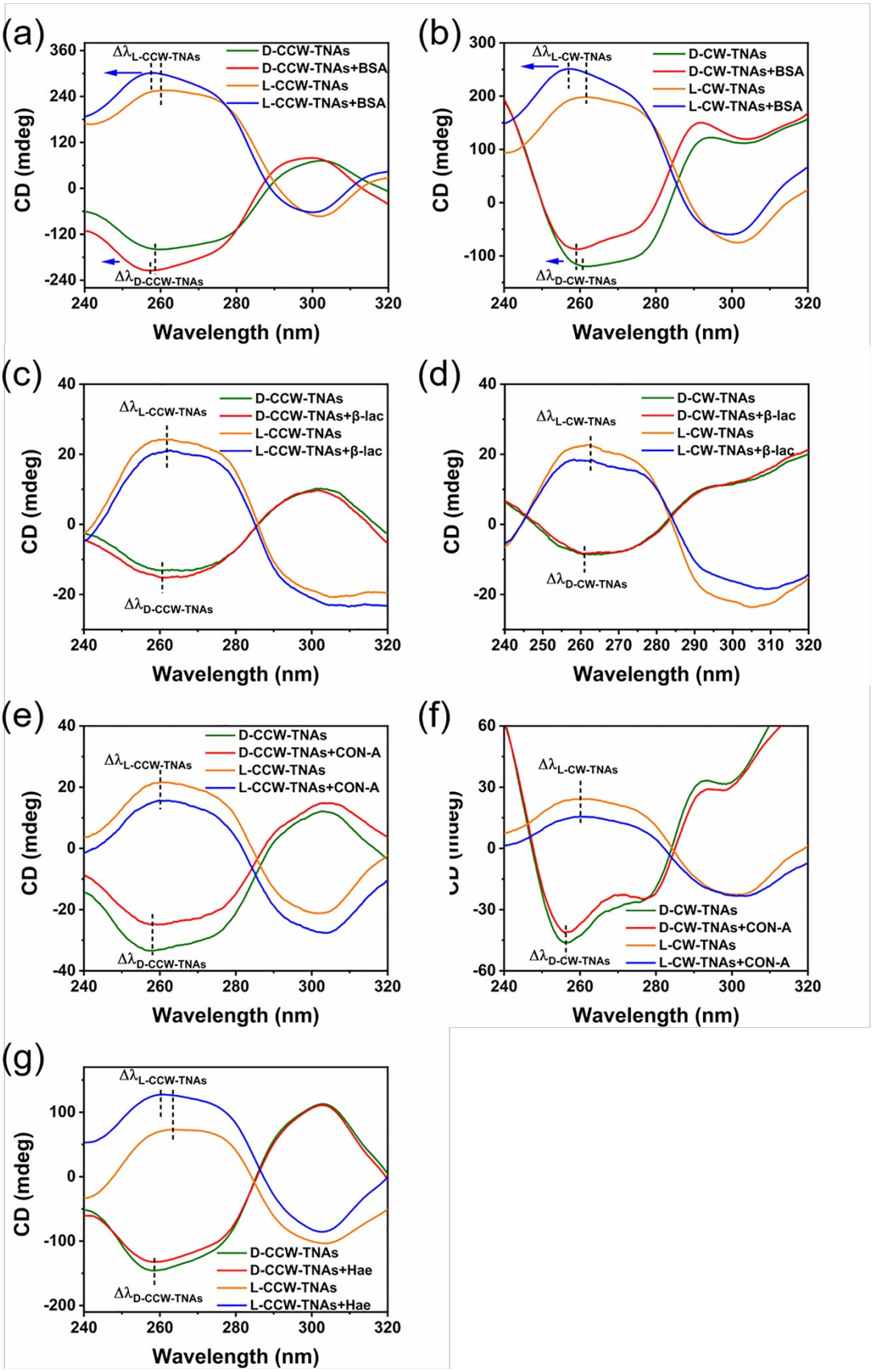

Fig. S9. CD spectra of TNAs at interband transition region before and after (a) and (b) BSA, (c) and (d) β-lac, (e) and (f) Con-A, (g) Hae adsorption.

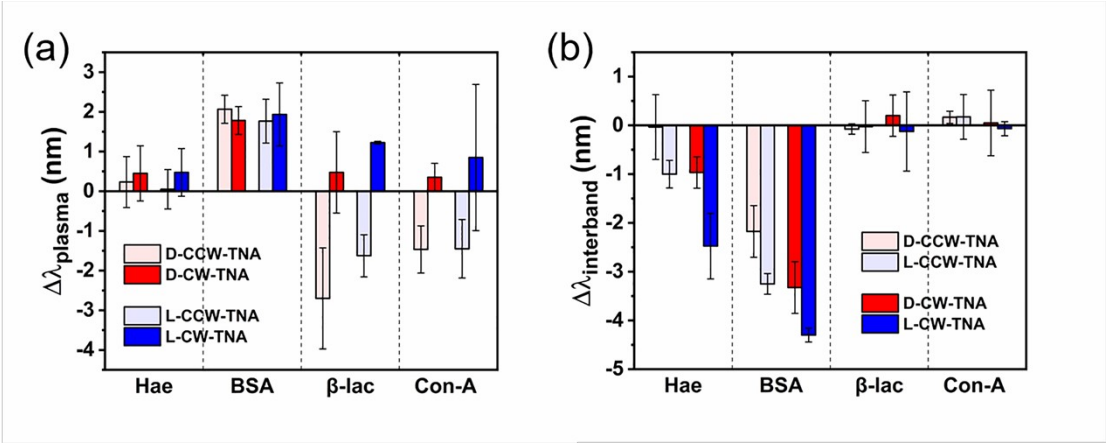

Fig. S10. (a) CD shifts at plasmonic extinction region of TNAs ($\Delta\lambda_{plasmonic}$). (b) CD shifts at interband transition region of TNAs ($\Delta\lambda_{interband}$). Note that these CD shifts were relatively smaller compared to previous reported using nanostructures, which should be ascribed to the micro-sized AgNWs in length used in fabrication of TNAs. This micro-sized TNAs would inevitably weak the light-matter interaction in UV-Visible region. But this didn't affect the reliability of chiral biosensing, especially the directionality of $\Delta\Delta\lambda_a$ and $\Delta\Delta\lambda_b$.