Supplementary information

Ultrathin Circular Polarimeter Based on Chiral Plasmonic Metasurface and Monolayer $MoSe_2$

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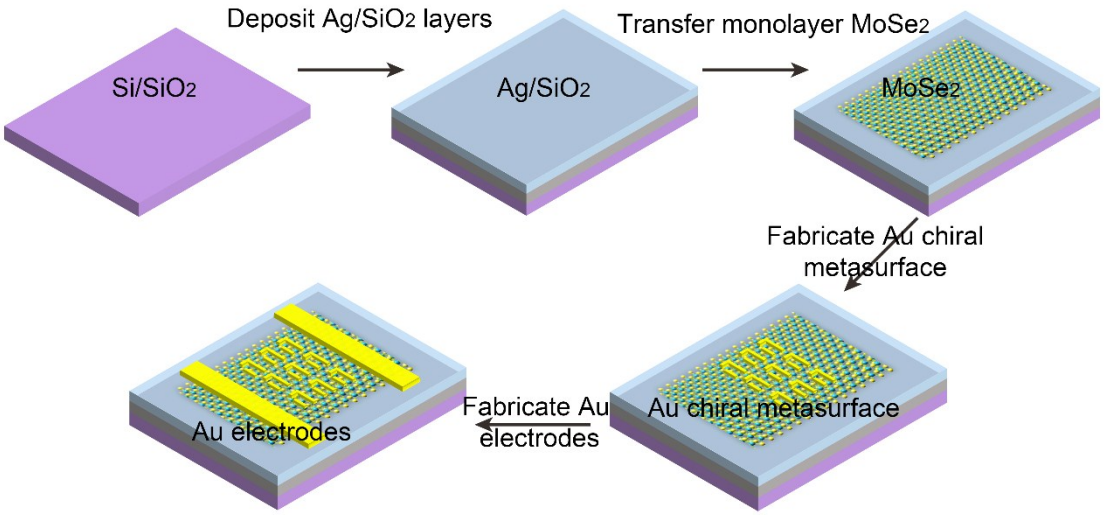

Fig. S1. Schematic flowchart illustrating the fabrication process for the ultrathin circular polarimeter.

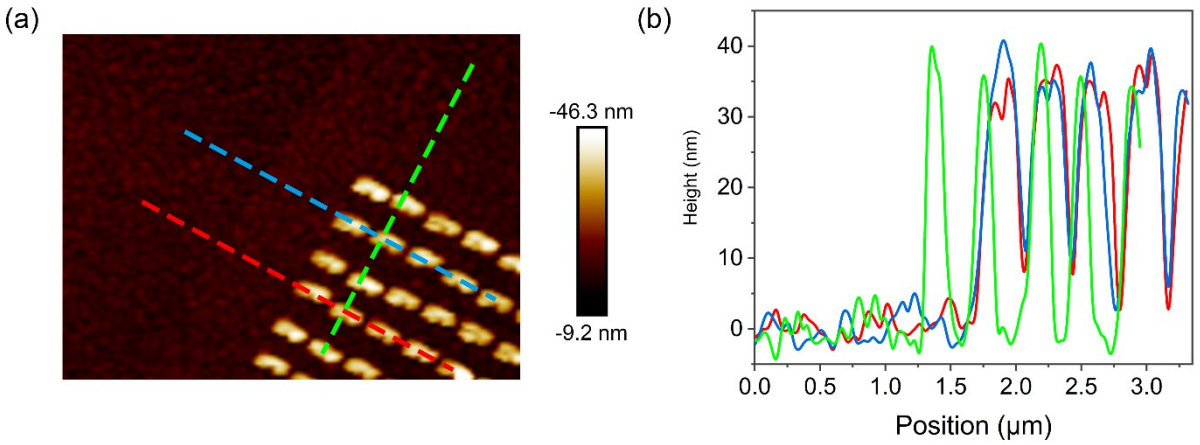

Fig. S2. (a) AFM topographic image of a test sample fabricated with the same process as main text. (b) The height along the corresponding dashed lines in the AFM topographic image. A thickness of 40 nm can be obtained from these measurements.

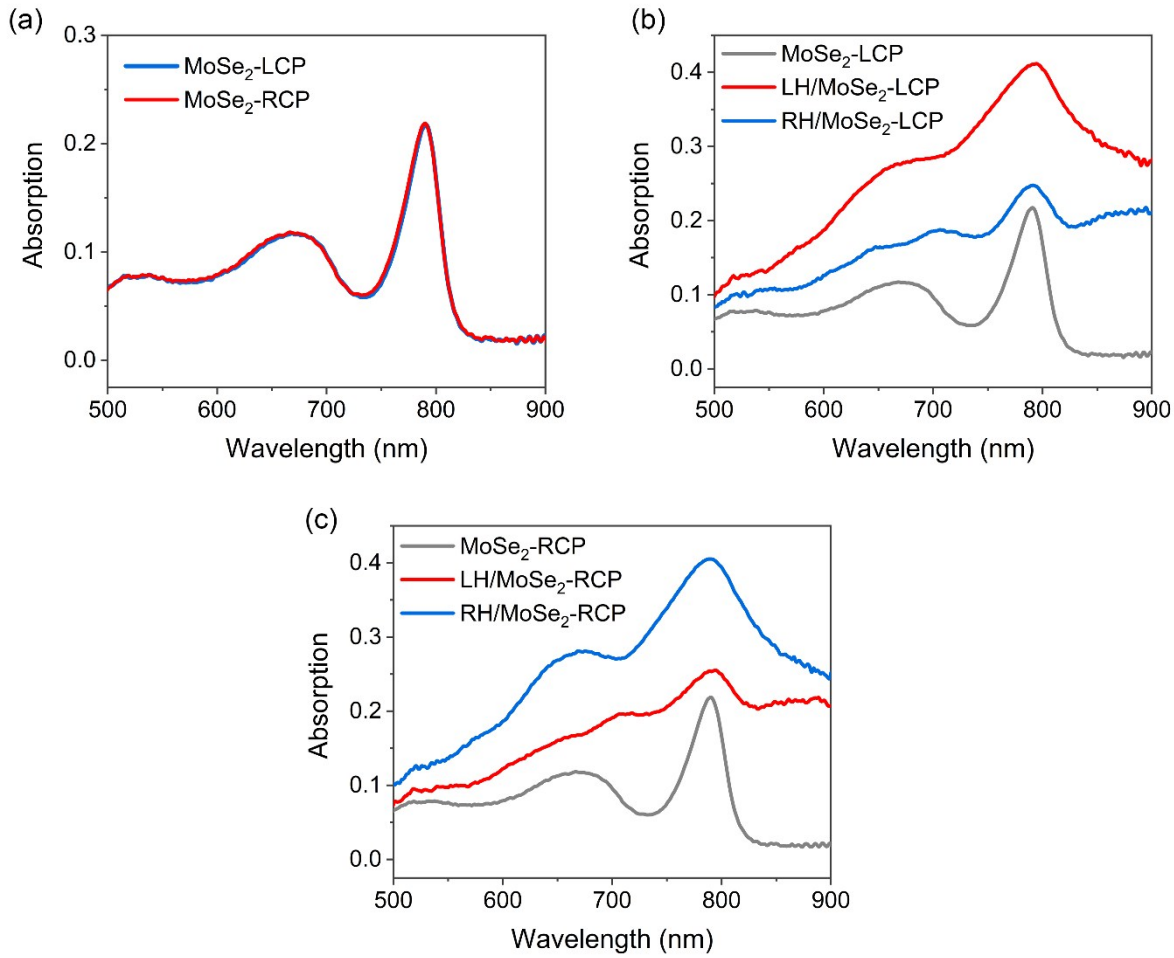

Fig. S3. (a) Measured absorption spectra of $MoSe_2$ without chiral metasurfaces under LCP and RCP light incidence. (b, c) Measured absorption spectra of bare $MoSe_2$ (without chiral metasurfaces), $MoSe_2$ integrated with left-handed metasurface and $MoSe_2$ integrated with right-handed metasurface under LCP (b) and RCP (c) incidence.

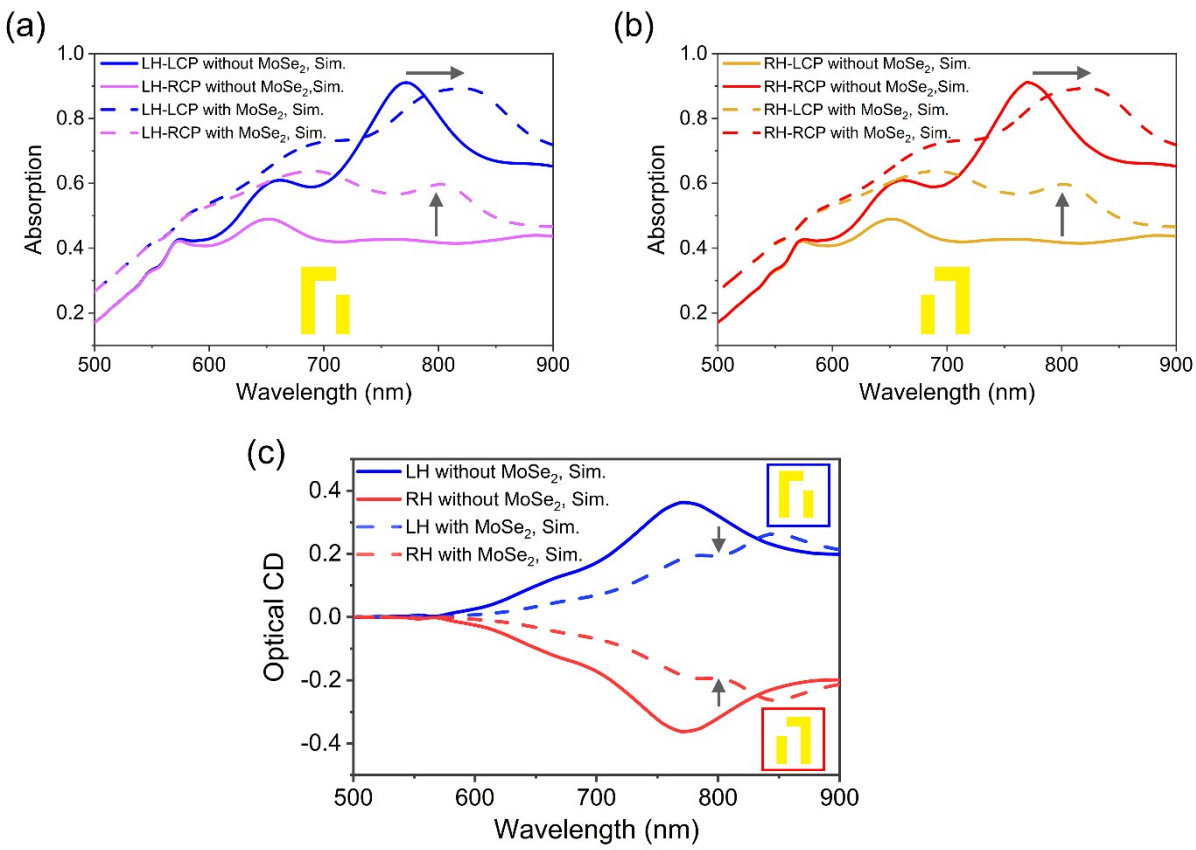

Fig. S4. Simulated absorptions and optical CD spectra of left-handed and right-handed plasmonic metasurfaces with and without $MoSe_2$ monolayer under CP light incidence. (a) Simulated absorptions of left-handed metasurface with (solid lines) and without (dashed lines) $MoSe_2$ monolayer. (b) Simulated absorptions of right-handed metasurface with (solid lines) and without (dashed lines) $MoSe_2$ monolayer. (c) Simulated optical CD spectra of left-handed (blue lines) and right-handed (red lines) plasmonic metasurfaces. The absorptions increase and are red-shifted slightly because of the influence of $MoSe_2$, and this further leads to the red-shift and decrease of optical CD as shown in (c).

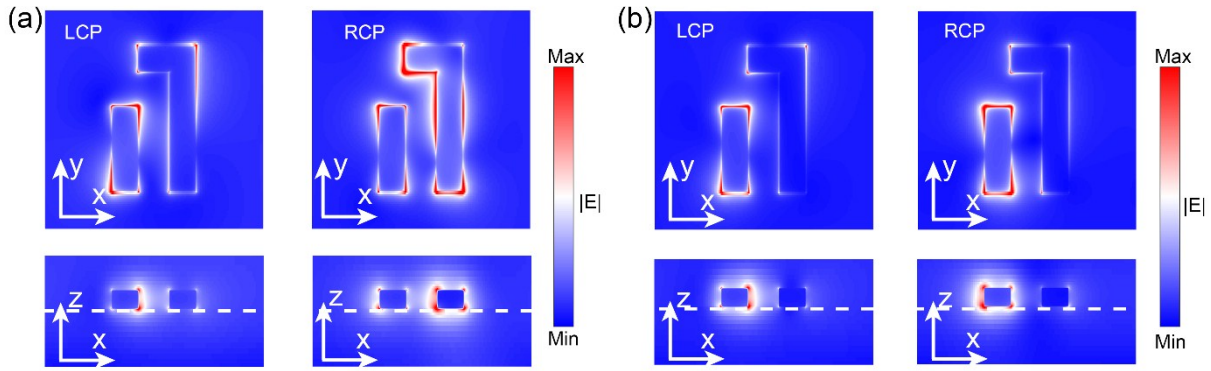

Fig. S5. Simulated electric field distributions of right-handed metasurface at wavelength of 790 nm (a) and 890nm (b) under CP light incidence.

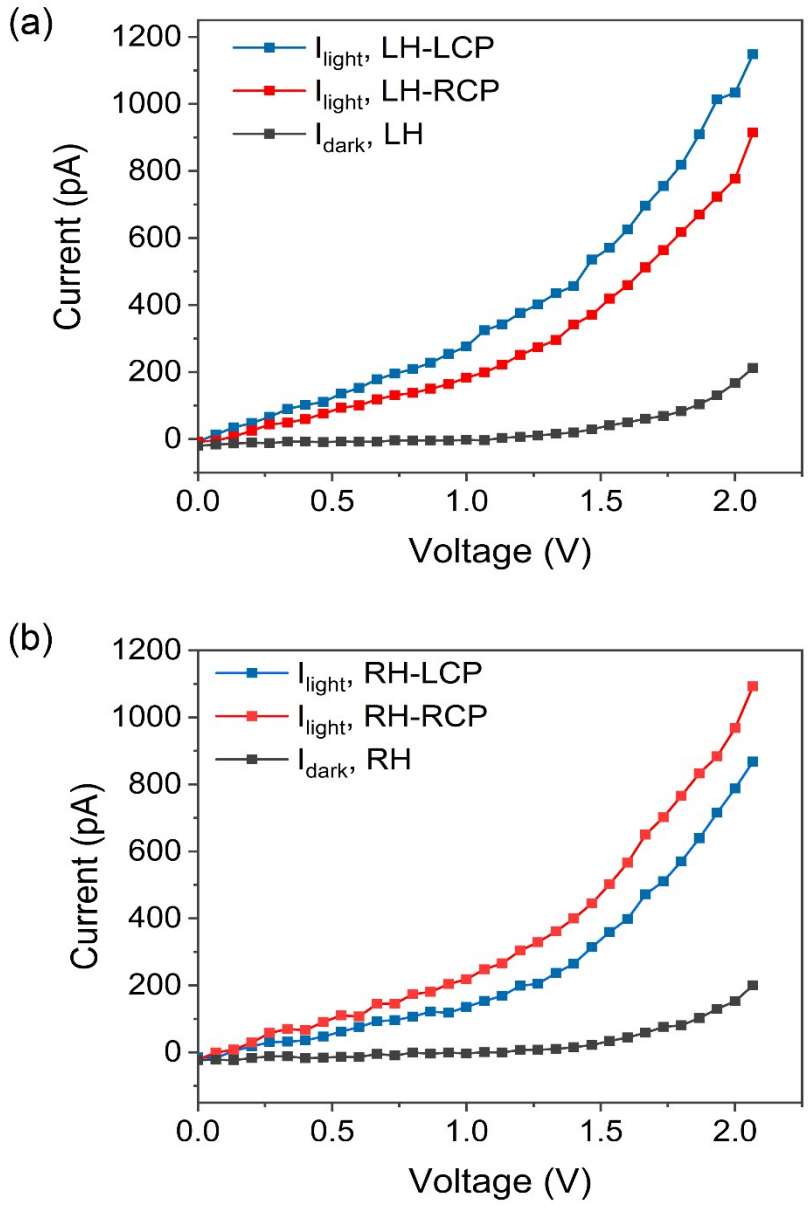

Fig. S6. Measured current with illumination (I_{light}) and without illumination (I_{dark}) of left-

handed (a) and right-handed (b) metasurfaces.

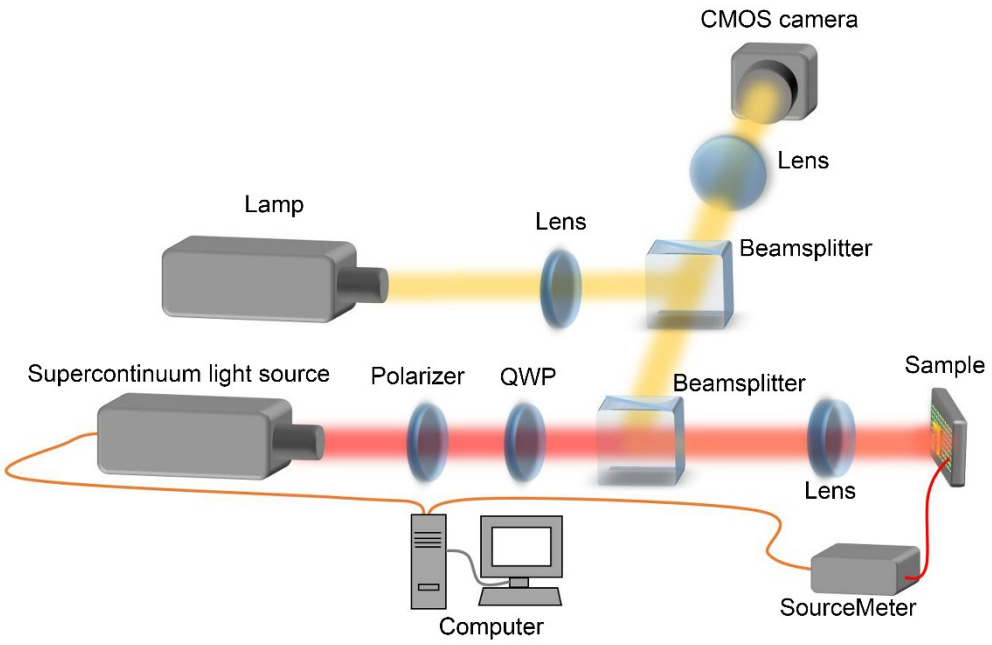

Fig. S7. Schematic of photocurrent detection system. A cascaded polarizer and quarter-wave plate (QWP) are used to generate circularly polarized incident light. The illumination system with a lamp and CMOS camera is used to find the fabricated devices on the substrate, which is turned off when measuring the photocurrent.