Supporting Information

In situ fabrication of self-filtered near-infrared $Ti_3C_2T_x$/n-Si Schottky-barrier photodiodes for continuous non-invasive photoplethysmographic system

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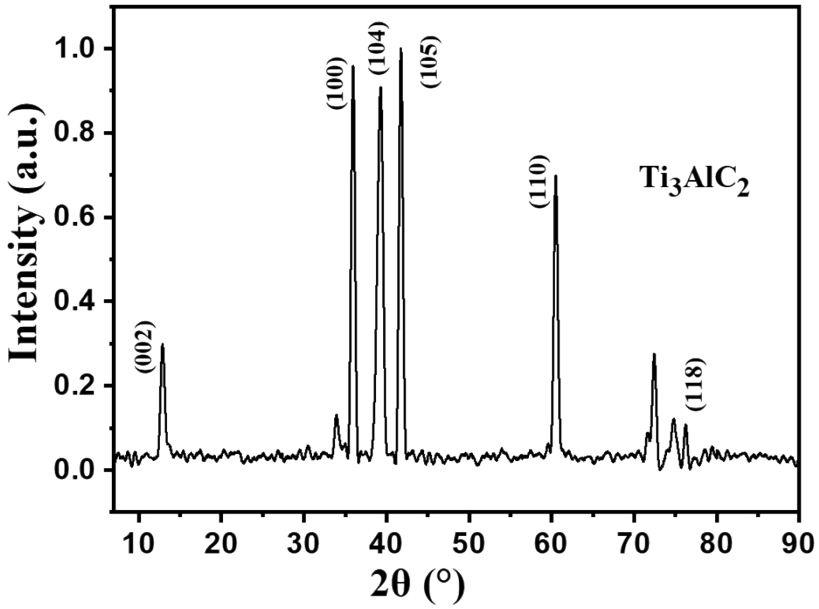

Figure S1. XRD pattern of the as-synthesized Ti_3AlC_2 film.

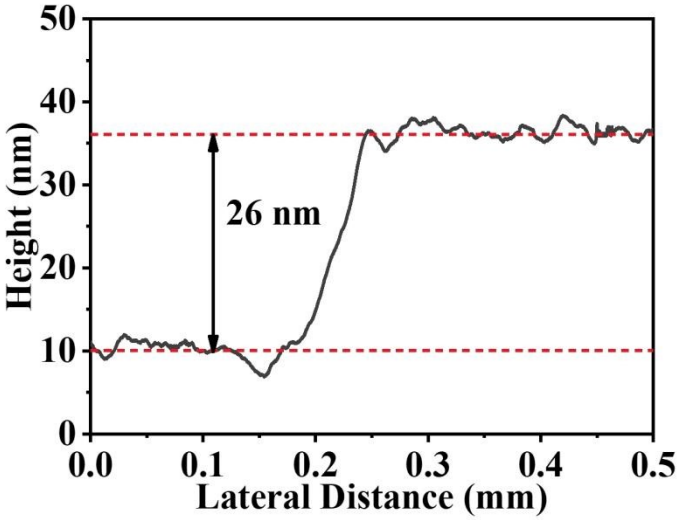

Figure S2. The height profile of the $Ti_3C_2T_x$ film on the Si substrate.

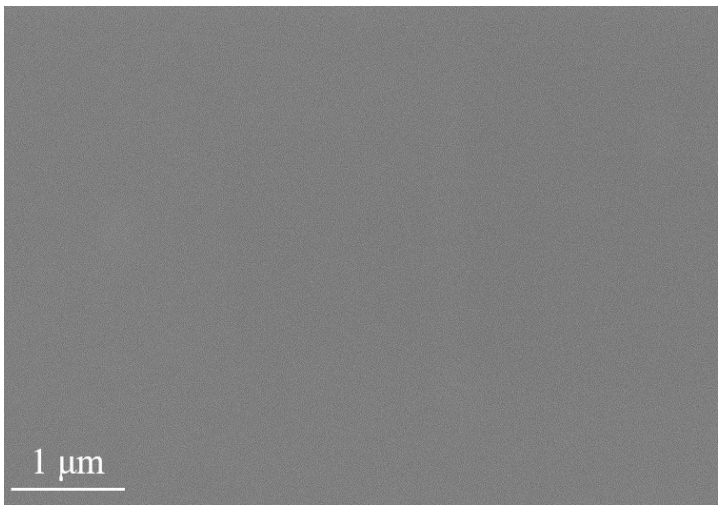

Figure S3. SEM image of the as-synthesized $Ti_3C_2T_x$ film.

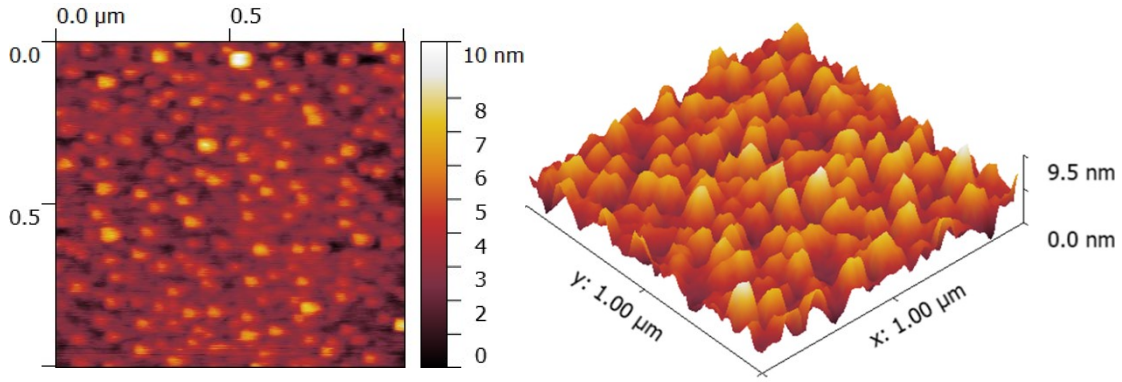

Figure S4. AFM images of the as-synthesized $Ti_3C_2T_x$ film.

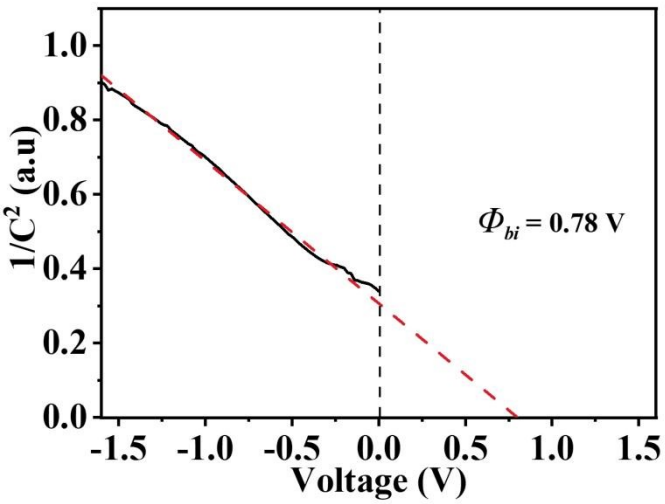

Figure S5. The reverse bias $1/C^2$-V characteristics of the $Ti_3C_2T_x$/n-Si Schottky-barrier photodiode.

From the $1/C^2$-V curve (Fig. S5), the built-in potential (ψ_{Bi}) on the semiconductor side can be calculated to be 0.78 eV. Moreover, the Φ_B of the device could be then calculated to be 1.02 eV based on the equation: $\Phi_B = q\psi_{Bi} + q\Phi_n + \frac{k_0 T}{q}$, where Φ_n is the value of potential difference between conduction band (E_C) and Fermi level (E_F) of semiconductor.

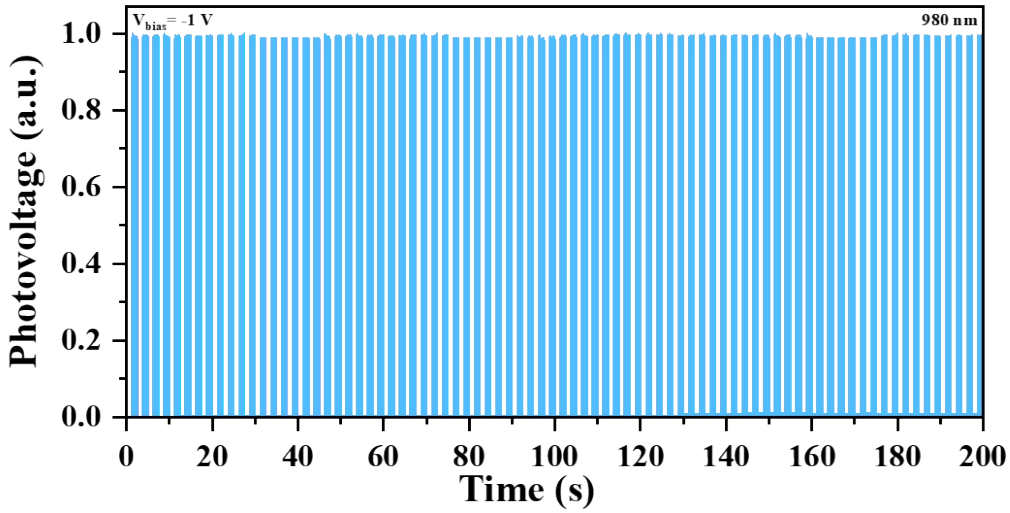

Figure S6. Time response of the device under 980 nm light illumination with 40 cycles.

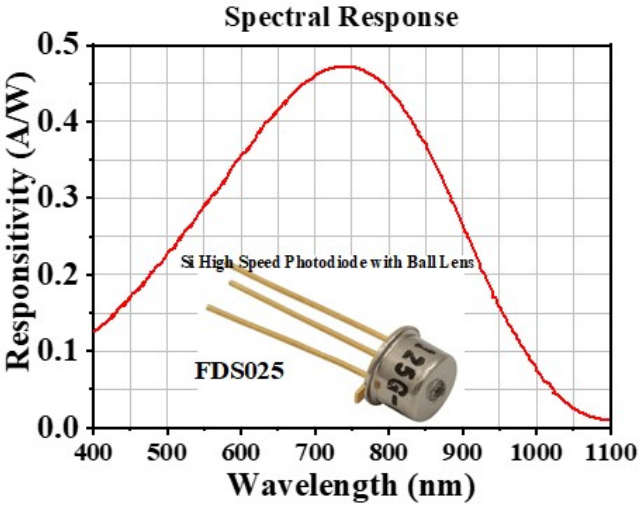

Figure S7. The wavelength-dependent responsivity curve of the commercial Si-based photodiode (Thorlabs FDS025).

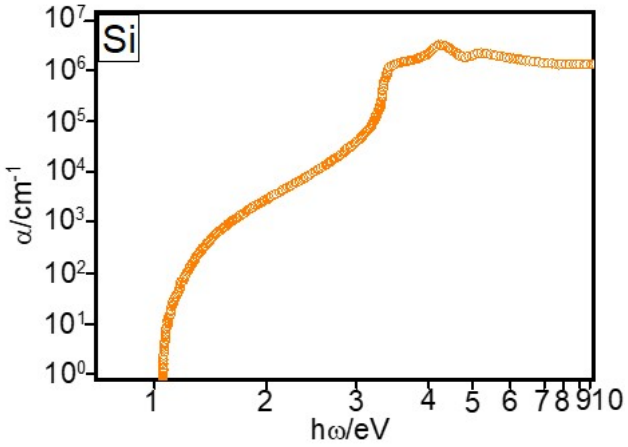

Figure S8. The absorption coefficient (α) curve of silicon.

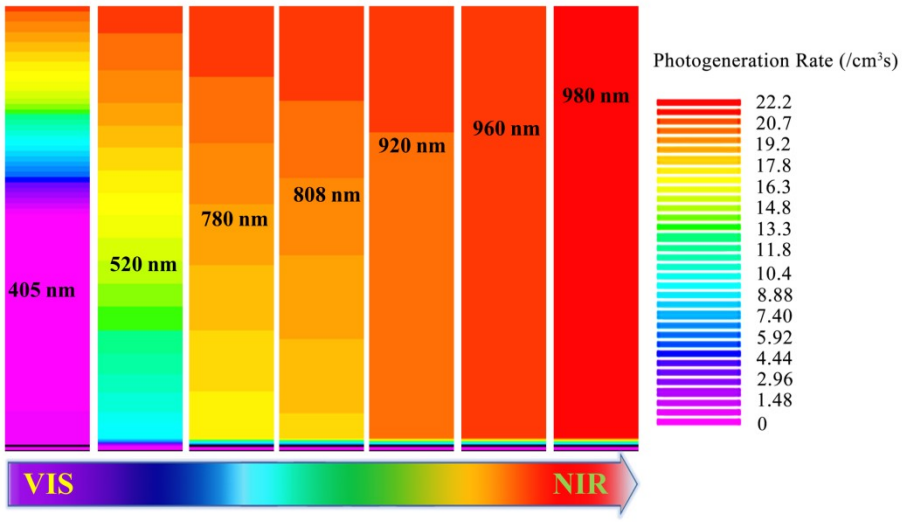

Figure S9. Simulated photogenerated rate distribution of the $Ti_3C_2T_x$/n-Si Schottky-barrier photodiode for different wavelengths of light.

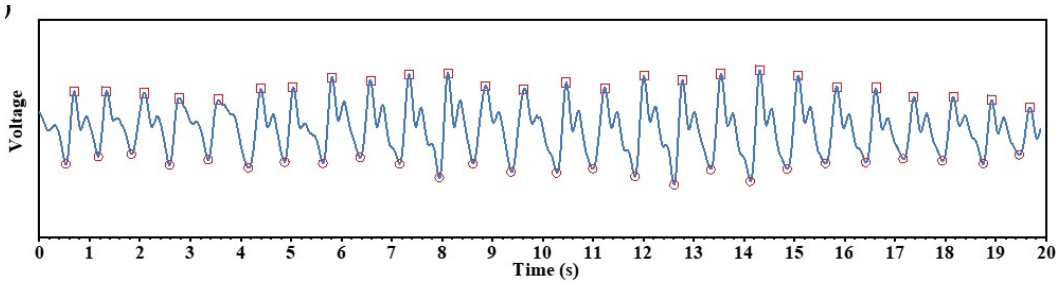

Figure S10. PPG signals with indication for systolic maxima (squares) and minima (circles).

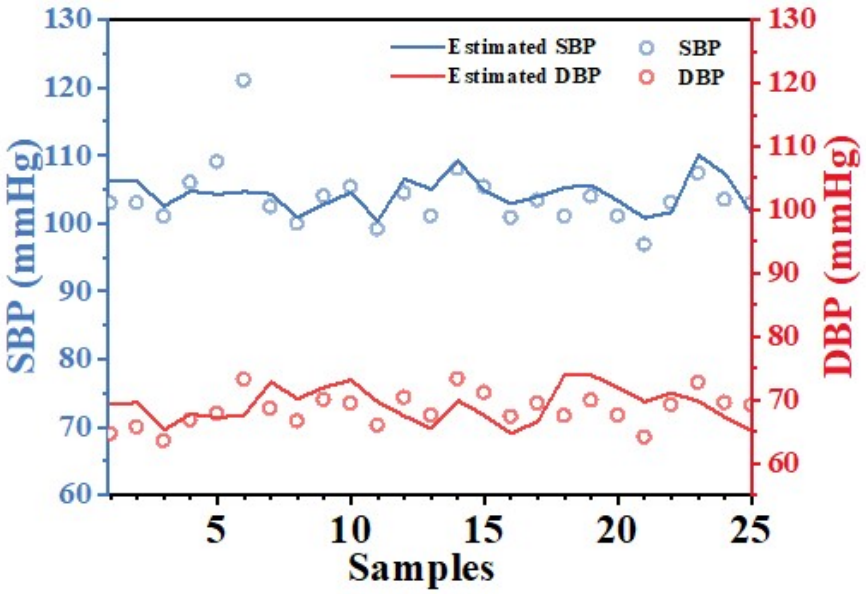

Figure S11. The Est. SBP and Est. DBP.