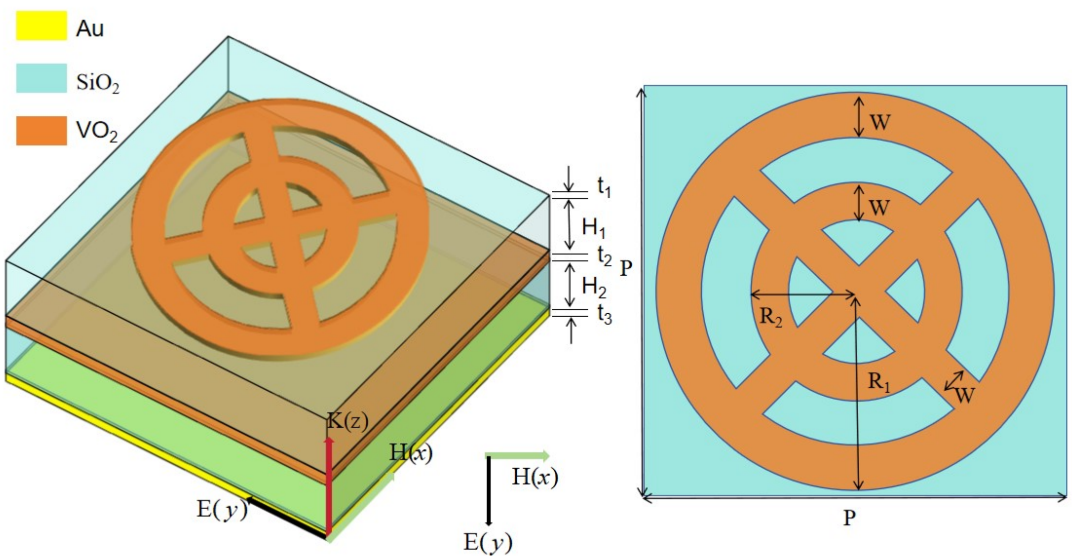

Figure 1: (a) 3D schematic diagram of the structure; (b) Top view of the unit cell structure.

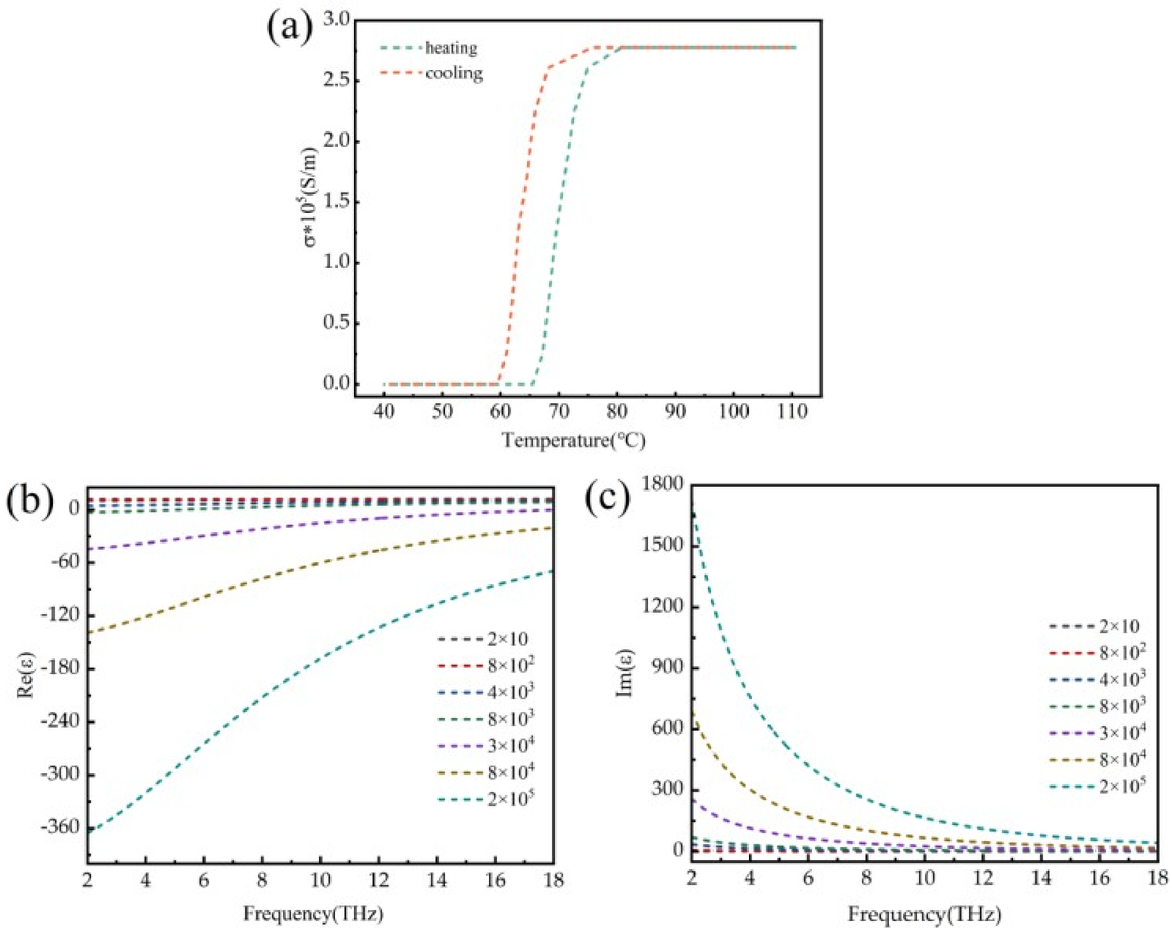

Figure 2 (a) Curve of VO_2 conductivity with ambient temperature; (b, c) real and imaginary parts of the relative dielectric constant of VO_2 at different conductivity

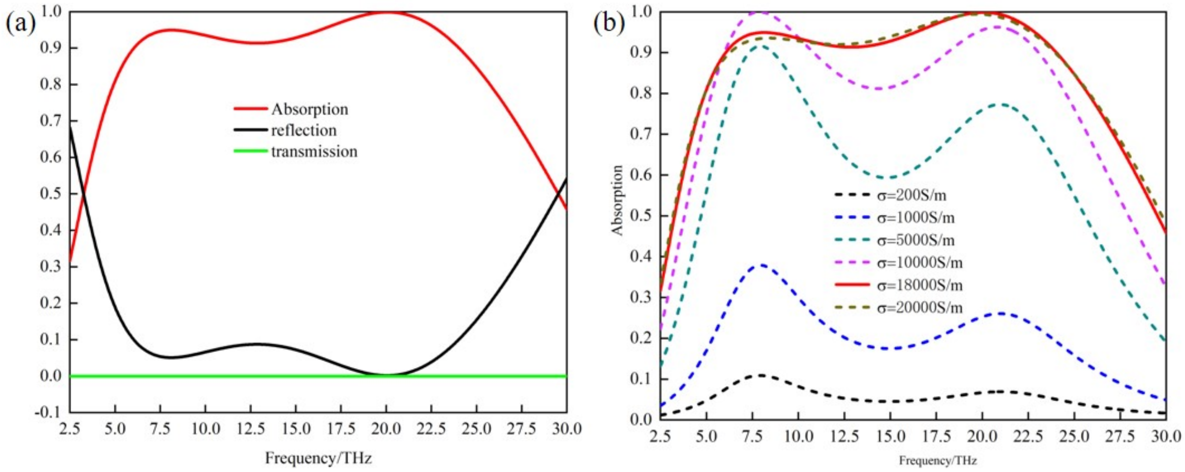

Figure 3 (a) Absorption, transmission, and reflection curves of the absorber; (b) Absorption rate curve of the absorber under different VO_2 conductivities.

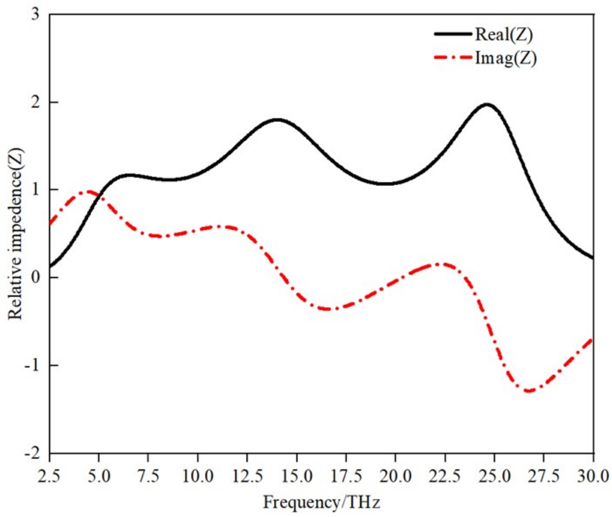

Figure 4. Real and imaginary parts of the relative impedance of the absorber.

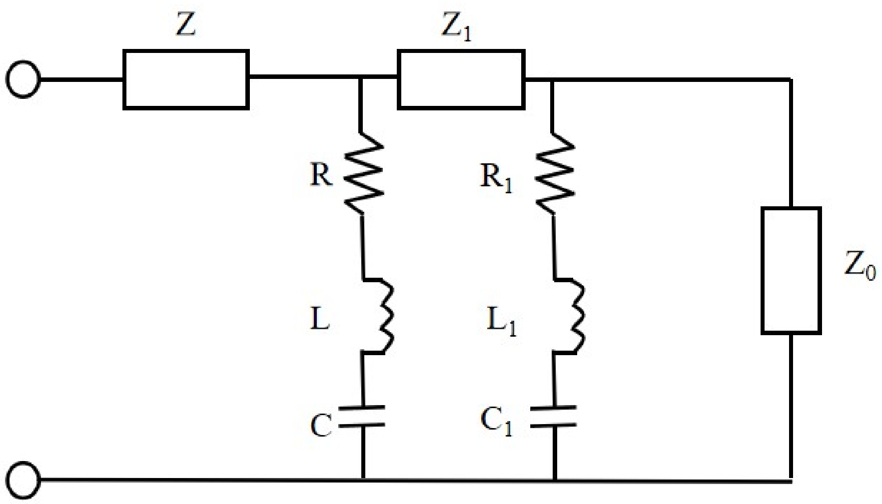

Figure 5. Equivalent circuit model of the absorber structure.

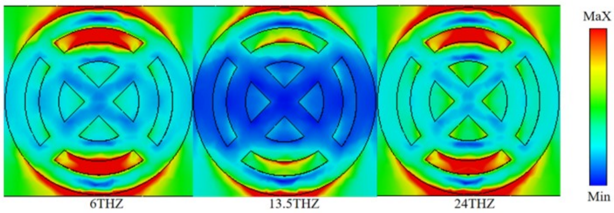

Figure 6. Electric field intensity distribution of the absorber at 5.9555 THz, 13.5 THz, and 24.008 THz frequencies.

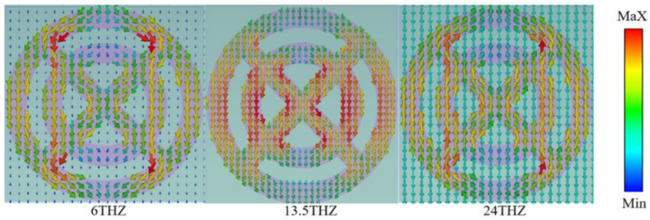

Figure 7 shows the current distribution of the absorber at frequencies of 5.9555 THz, 13.5 THz, and 24.008 THz.

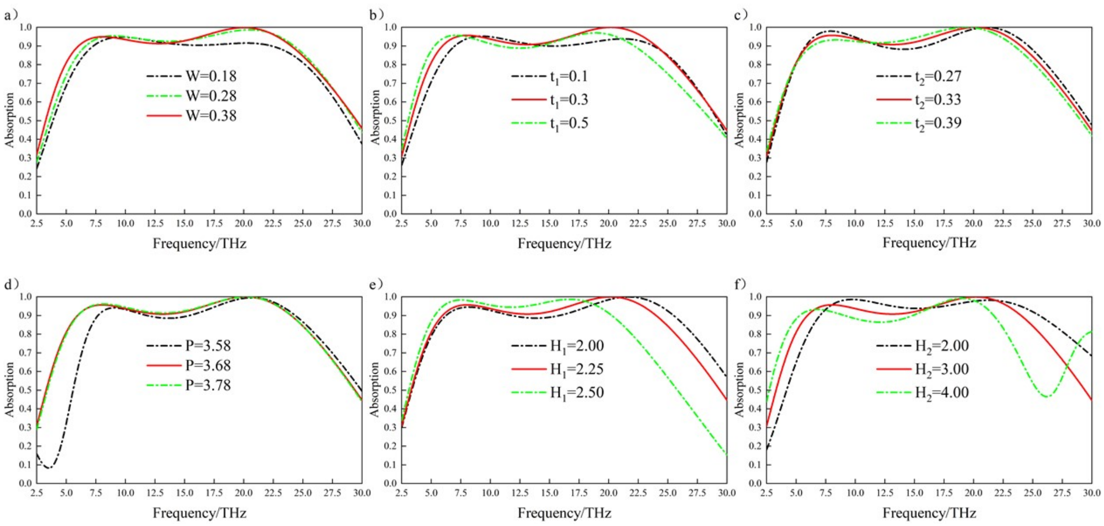

Figure 8: Optimization of the absorber's structural parameters.

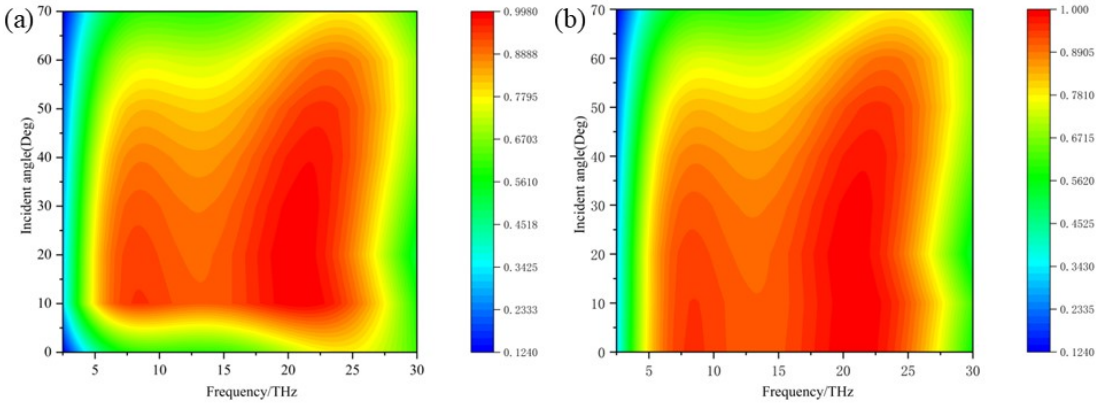

Figure 9: Absorption spectra of the absorber in TE and TM modes; (a) and (b) show the spectra for different incident angles.

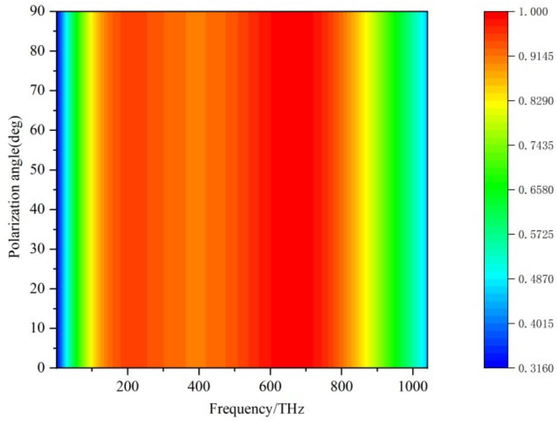

Figure 10: Absorption spectra of the absorber in TE and TM modes;It show the spectra for different polarization angles.

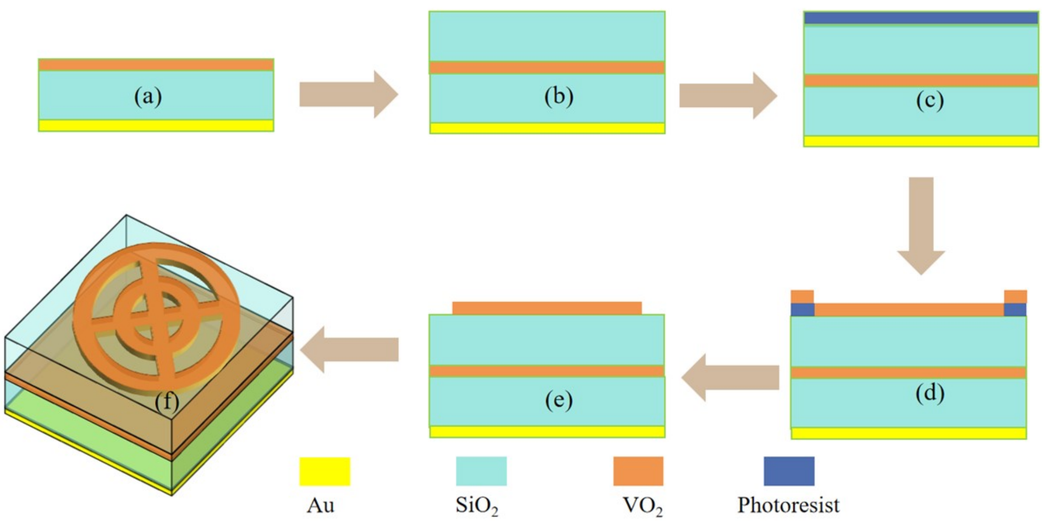

Figure 11: Process flow diagram of the absorber fabrication.

Table 1: Performance comparison of the absorber proposed in this study with recent related absorbers.

Reference	**FB > 90 (μm)**	**BW > 90 (THz)**	**Number of Layers**	**Dimension (μm^3)**	**Functions**
17	19.23-78.95	11.8	4	22×22×7.1	narrowband and broadband
25	70.75-145.65	2.18	3	23×23×15	broadband
26	66.67-200	3	5	25×25×10	broadband
27	32.61-333.33	8.3	3	80×80×377	broadband
28	89.29-223.88	6.52	4	24×24×7.2	broadband
29	89.29-223.88	2	3	40×40×21	broadband
This work	12.5-50	18	5	3.68×3.68×5.98	broadband