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Supporting information

Regulation of Oxygen Vacancy on Behaviors of Memristors Based on Amorphous ZnTiSnO Films

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Figure section

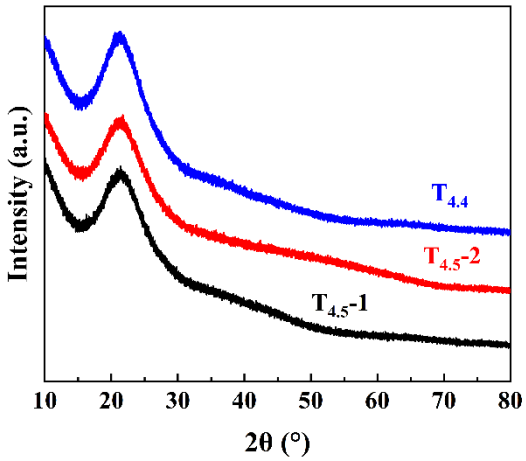

Fig. S1 XRD spectrums of as-deposited ZnTiSnO films prepared in parallel at 4.5 Pa and 4.4 Pa. The black and red curves are sampled to different regions of the 4.5 Pa film, while the blue represents the curve of the 4.4 Pa sample as a control.

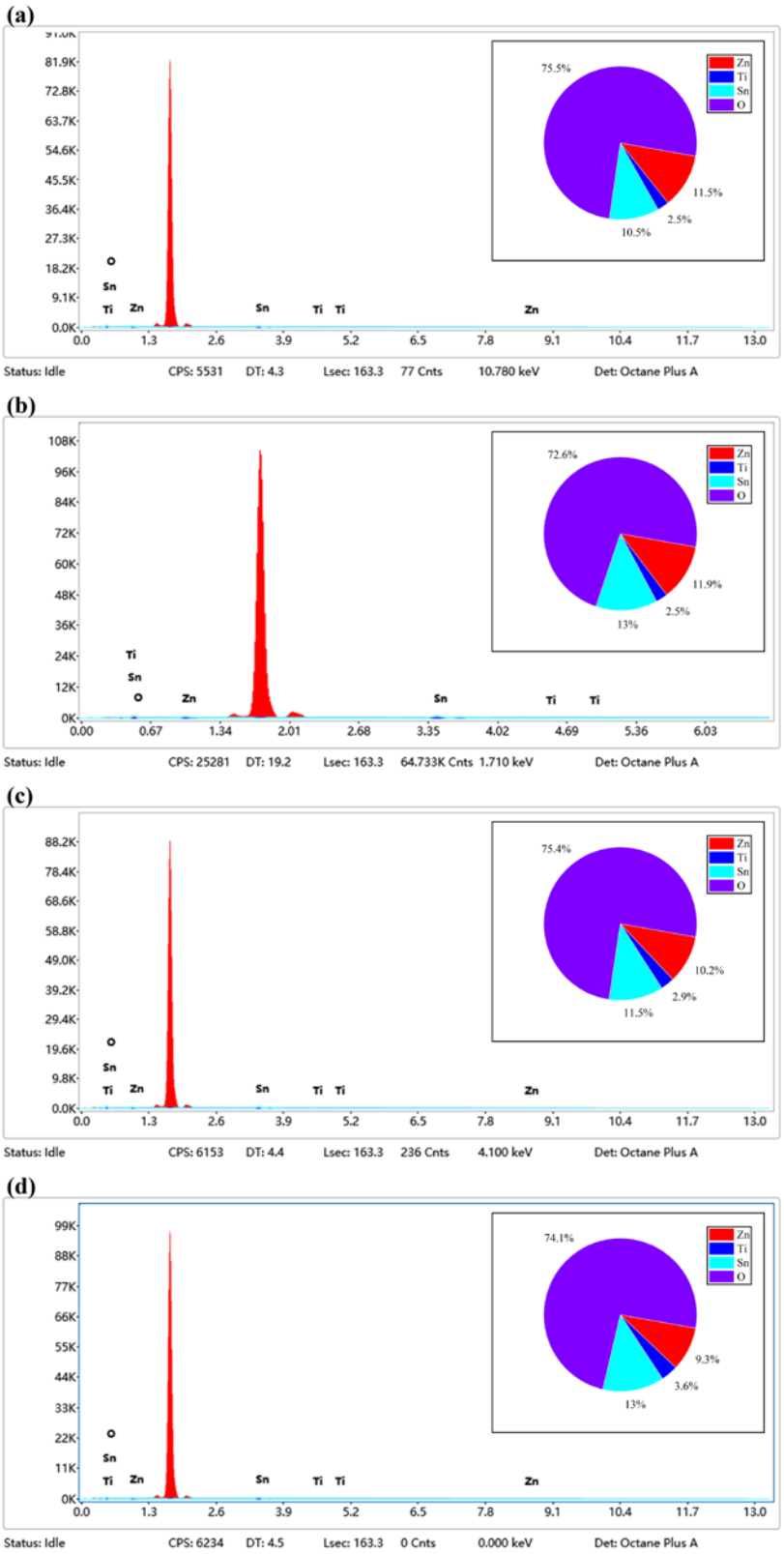

Fig. S2 Element ratios on the surface of amorphous ZnTiSnO thin films prepared at different oxygen pressures: (a) 4.5 Pa; (b) 4.4 Pa; (c) 1.8 Pa; (d) 0 Pa.

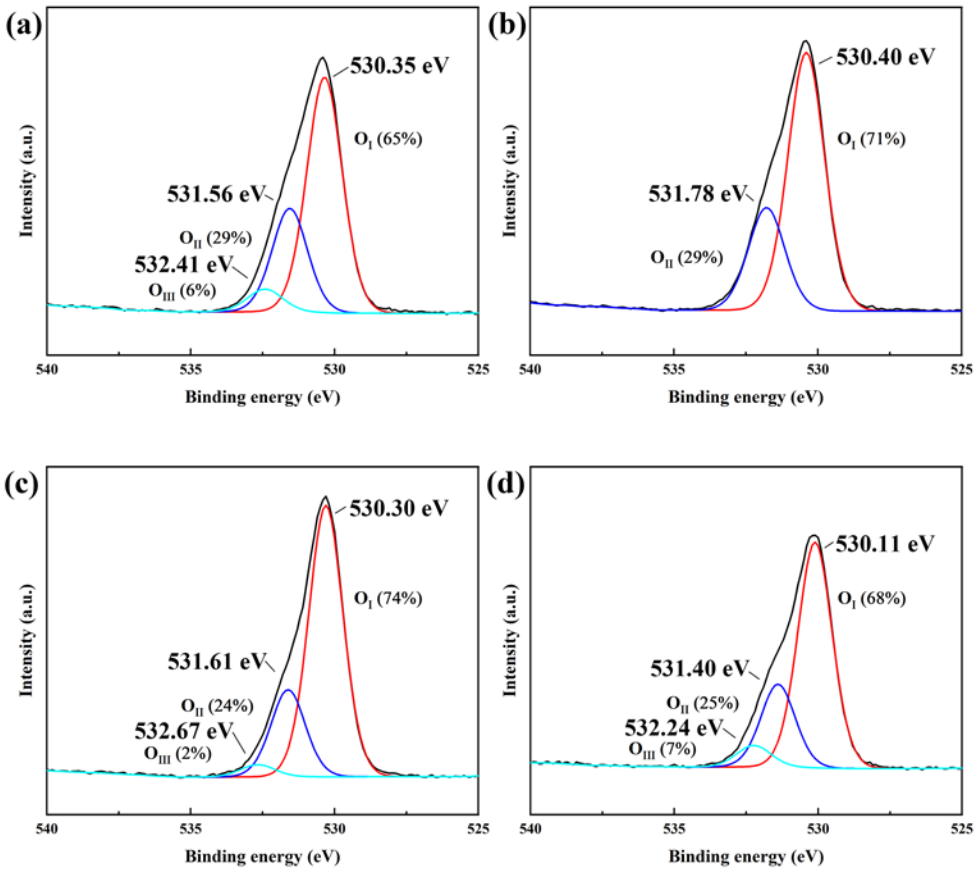

Fig. S3 O 1s XPS image of Amorphous ZnTiSnO thin films. Oxygen pressure: (a) 4.5 Pa; (b) 4.4 Pa; (c) 1.8 Pa; (d) 0 Pa.

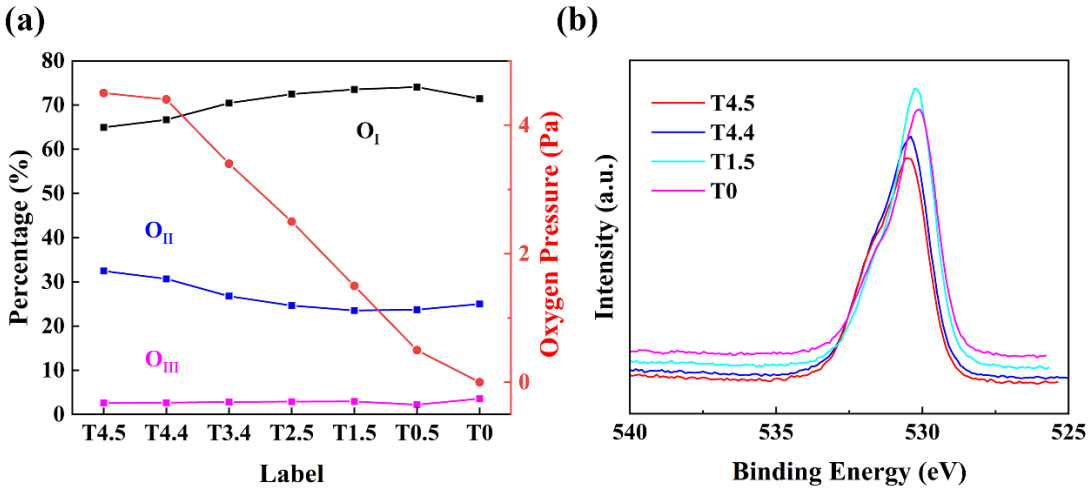

Fig. S4 Extended XPS characterization of amorphous ZnTiSnO thin films. (a) The variation of O_I, O_{II}, O_{III} ratio with the oxygen atmosphere during preparation. (b) Corresponding O 1s peaks.

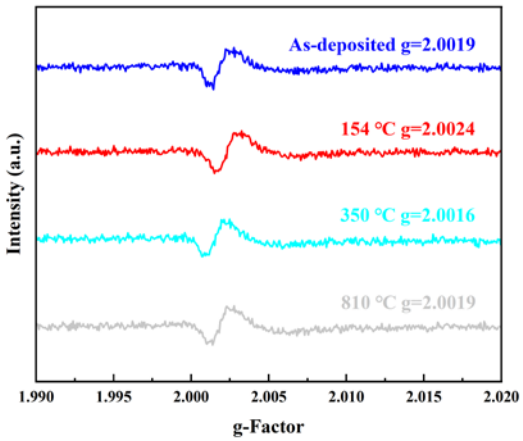

Fig. S5 Electron spin resonance spectra of amorphous ZnTiSnO thin films (4.4 Pa) annealed at different temperatures.

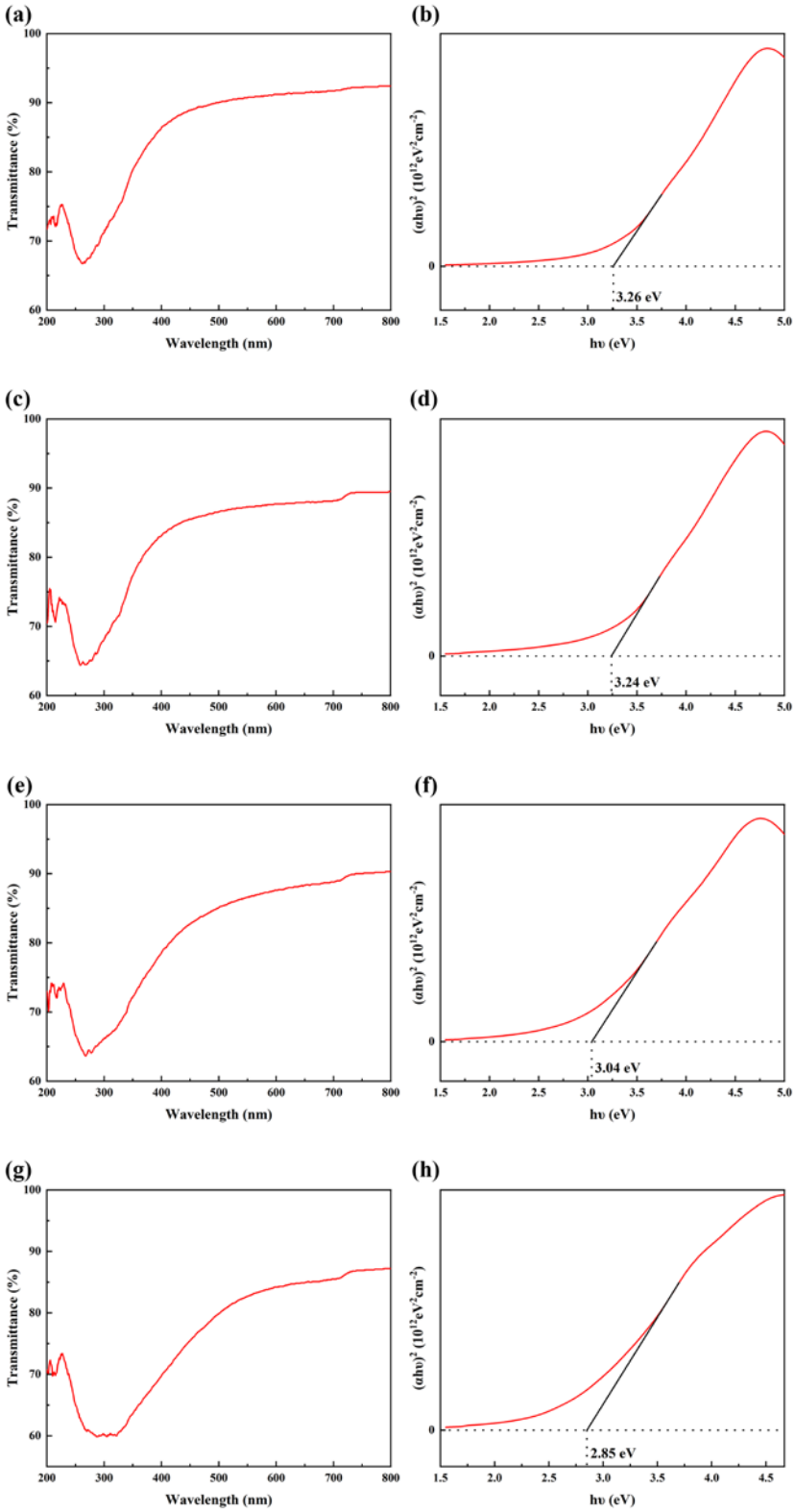

Fig. S6 Optical transmittance and optical band gap of amorphous ZnTiSnO thin films prepared at different oxygen pressures: (a), (b) 4.5 Pa; (c), (d) 4.4 Pa; (e), (f) 1.8 Pa; (g), (h) 0 Pa.

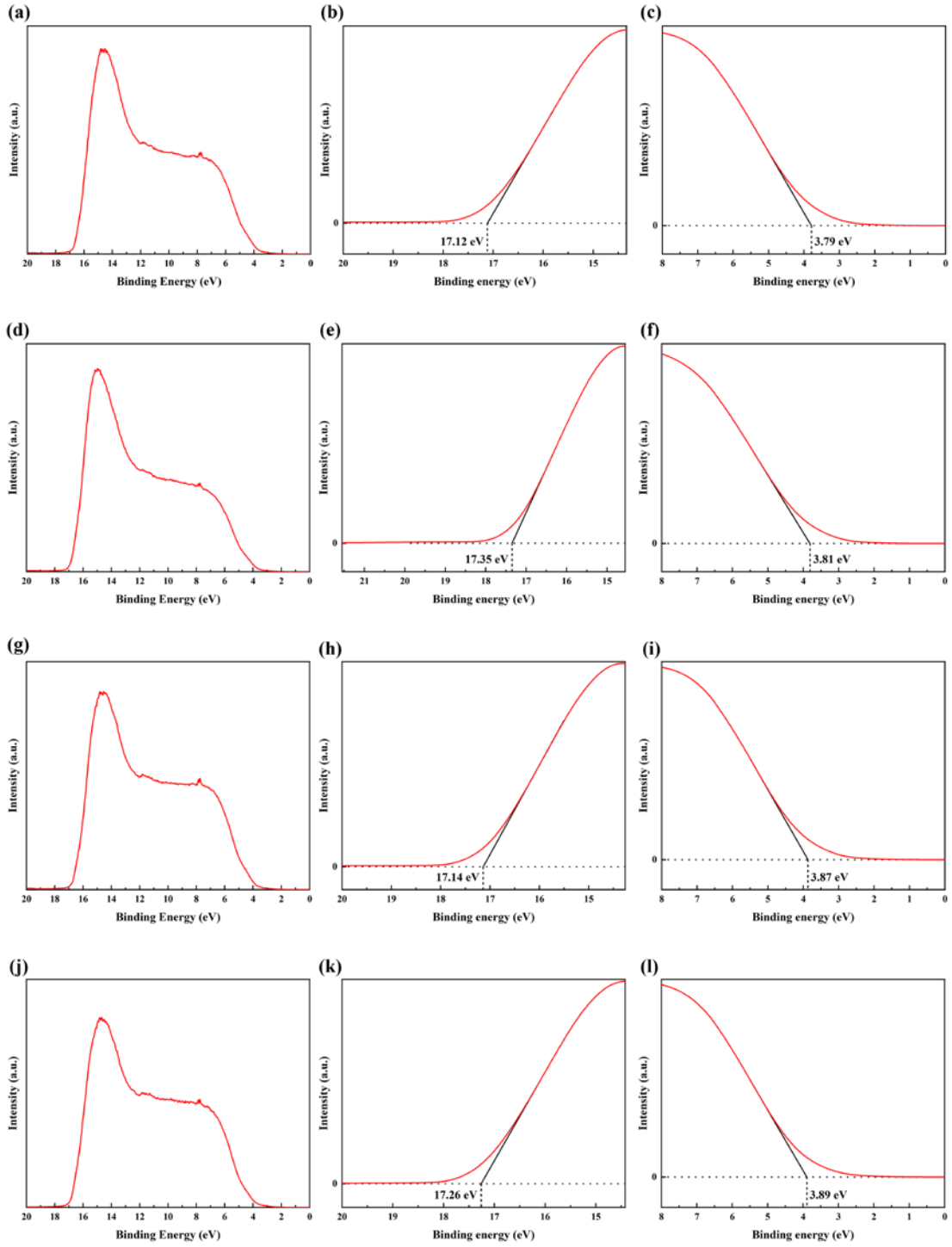

Fig. S7 Valence band spectra, cutoff edge and Fermi edge of amorphous ZnTiSnO thin films prepared at different oxygen pressures: (a), (b), (c) 4.5 Pa; (d), (e), (f) 4.4 Pa; (g), (h), (i) 1.8 Pa; (j), (k), (l) 0 Pa.