

Supplementary Information

Enhanced UV detection performance of CdZnTe-based photodetector through surface polishing treatment

Zilong Zhang¹, Keyun Gu¹, Fan Yang¹, Jian Huang^{1,*}, Ke Tang¹, Yue Shen¹, Jieyu Zhang¹,

Meiyong Liao^{2,*} and Linjun Wang¹

¹ School of Materials Science and Engineering, Shanghai University, Shanghai 200444, PR China

² Research Center for Functional Materials, National Institute for Materials Sciences (NIMS), Namiki 1-

1, Tsukuba, Ibaraki 305-0044, Japan

Correspondence should be addressed to Jian Huang* (jianhuang@shu.edu.cn) or Meiyong Liao*

(meiyong.liao@nims.go.jp)

1. The thickness of the CZT films

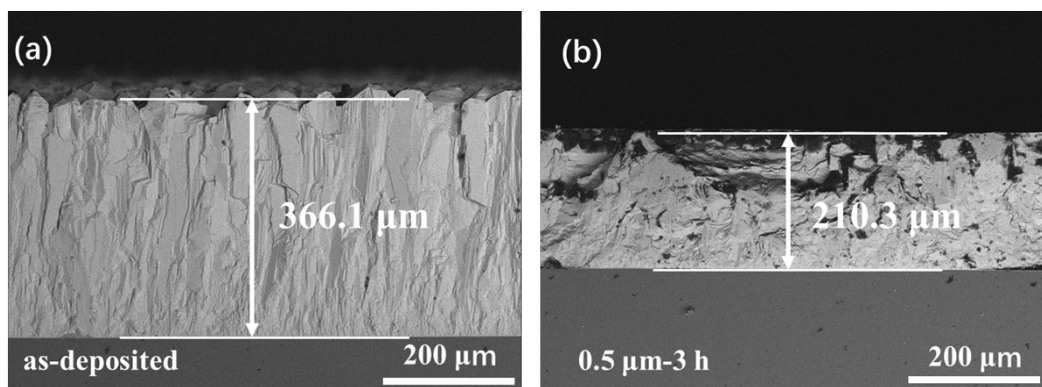


Fig. S1 SEM images of cross-sections of (a) as-deposited and (b) as-MP CZT films.

2. Crystal structure parameters of as-chemical etching-polishing (CP) CZT films etched in various concentrations of Br-MeOH based on the XRD patterns.

Table S1 XRD data of as-CP CZT films chemical etching in different concentrations of Br-MeOH solution

Br-MeOH concentration	2θ (°)	d (Å)	FWHM (°)	Grain size (nm)
1%	23.76	3.74	0.186	43.65
2%	23.84	3.73	0.184	44.13
3%	23.68	3.75	0.187	43.41
4%	23.64	3.76	0.184	44.11
5%	23.60	3.77	0.192	42.27

3. EDS data of as-CP CZT films in Br-MeOH solution with different concentrations

Table S2 EDS data of as-CP CZT films with different concentrations of Br-MeOH

Br-MeOH concentration	Cd (at, %)	Te (at, %)	Zn (at, %)
1%	48.68	49.54	1.78
2%	48.78	49.70	1.52
3%	48.74	50.28	0.99
4%	48.41	50.51	1.08
5%	45.79	52.01	2.20

4. Crystal structure parameters of as-CP CZT films etched in 2%-Br-MeOH with varying etching duration.

Table S3 XRD data of as-CP CZT films chemical etching in 2%-Br-MeOH solution

Etching time (min)	2θ (°)	d (Å)	FWHM (°)	Grain size (nm)
1	23.84	3.73	0.184	44.13
3	23.84	3.73	0.199	40.80
5	23.74	3.74	0.197	41.20
7	23.62	3.76	0.185	43.87

5. EDS data of as-MP CZT films in 2%-Br-MeOH solution with different etching times

Table S4 EDS data of as-CP CZT films after chemical etching polishing in 2%-Br-MeOH with different durations

Etching time (min)	Cd (at, %)	Te (at, %)	Zn (at, %)
1	48.78	49.70	1.52
3	48.29	50.60	1.11
5	48.37	50.63	1.00
7	45.83	51.97	2.20

6. Detector performance of CZT-based detector with the UV illumination on and off.

Table S5 the rise time and decay time of CZT-based detectors under varying surface treatments.

Detector	Rise time (s)	Decay time (s)
As-grown	0.78	1.10
MP	0.52	0.88
MP+CP	0.35	0.48
MP+CP+NH ₄ N/H ₂ O ₂	0.21	0.40
MP+CP+ZnS	0.27	0.46