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Electronic Supplementary Information

Bias Stress Stable Aqueous Solution Derived Y-Doped ZnO Thin Film Transistors

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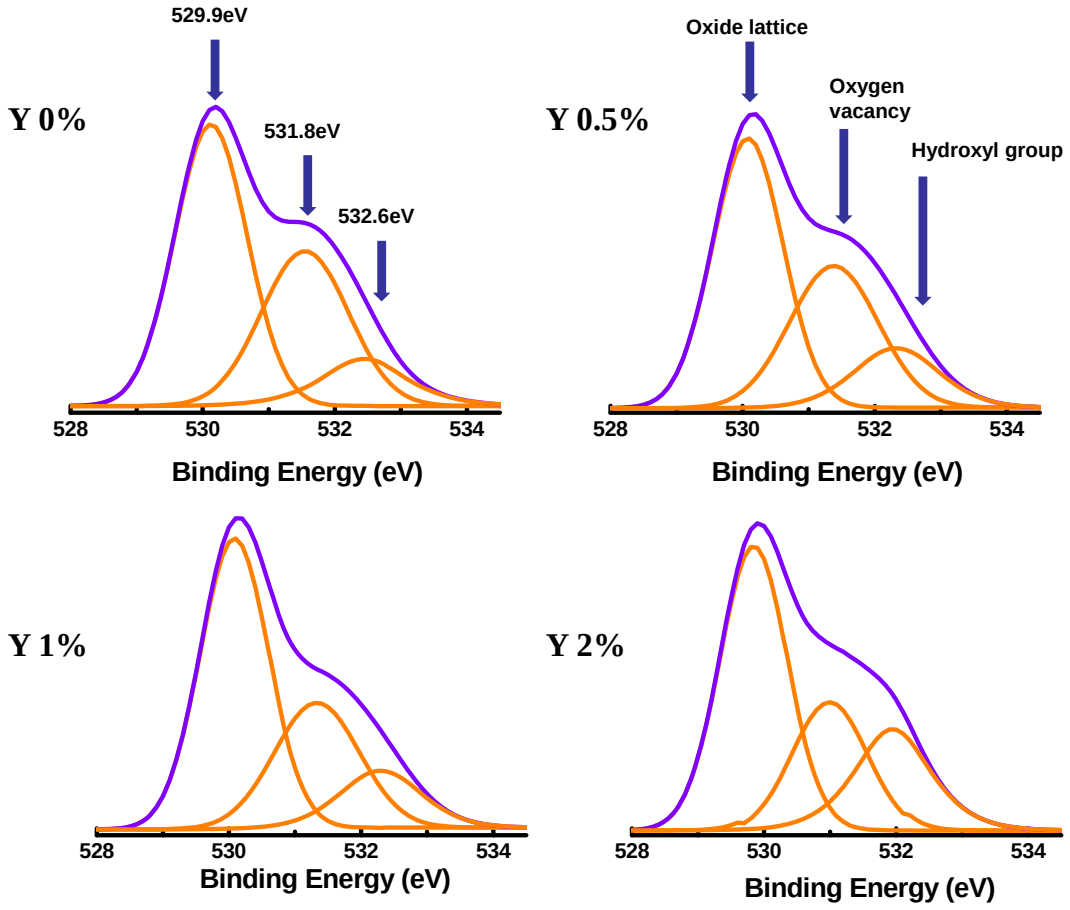


Fig. S1. XPS spectra of the O1s core level line for the solution processed YZO films as a function of Y content.

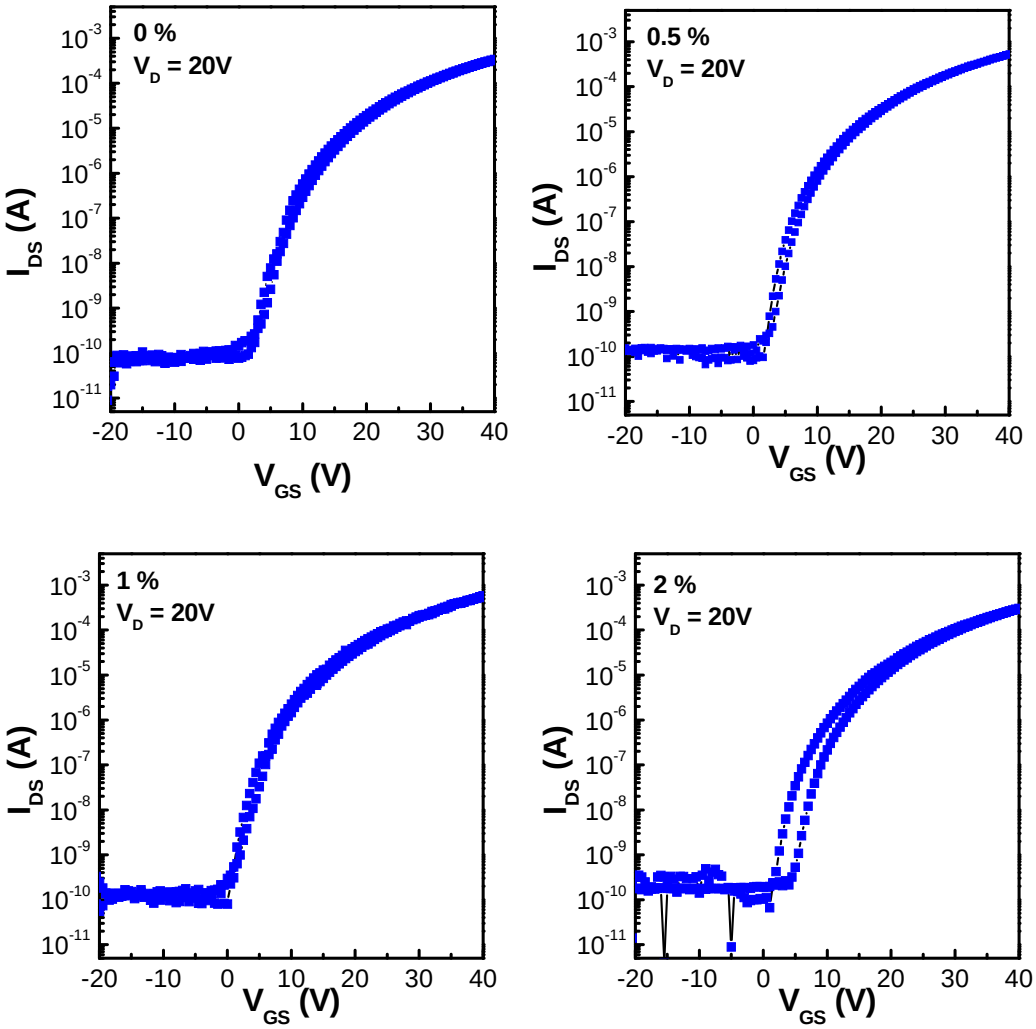


Fig. S2. Transfer characteristics of YZO TFTs as a function of Y doping concentration.

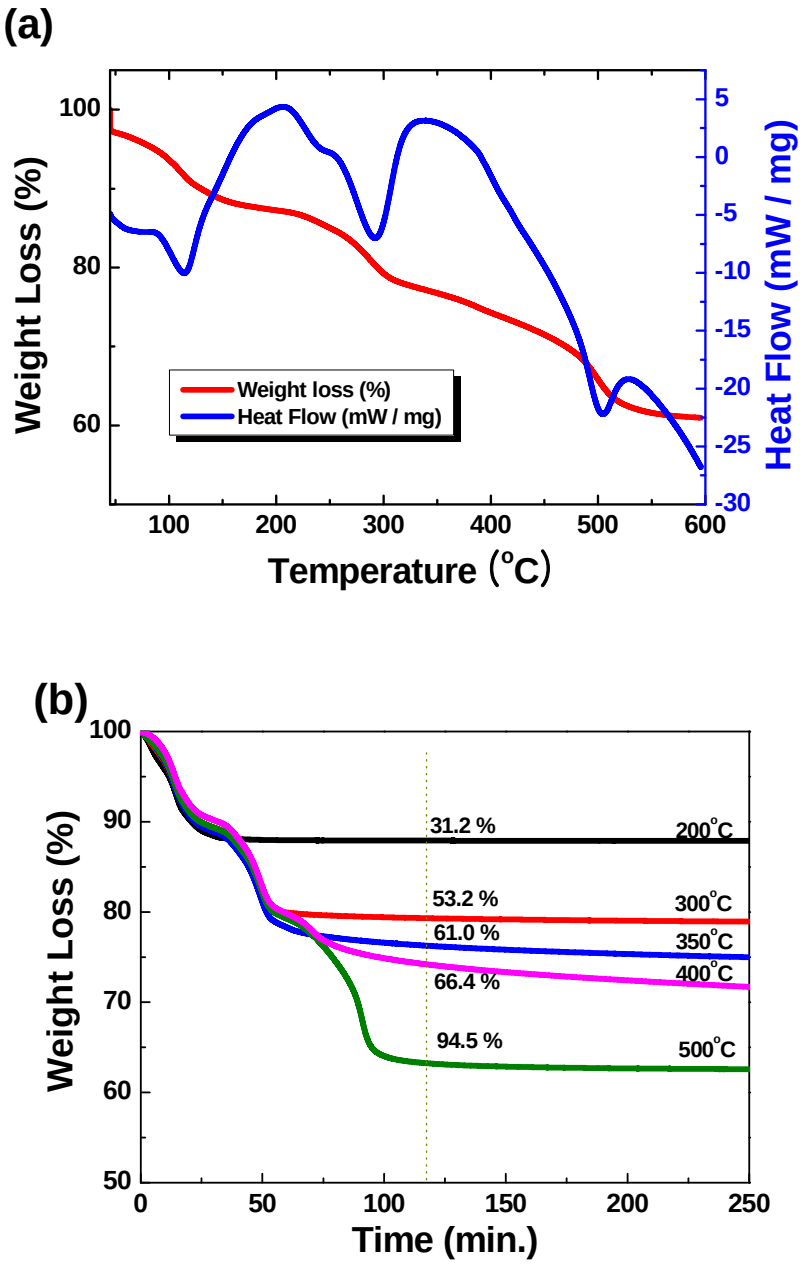


Fig. S3. (a) Thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC) and **(b)** thermal behavior as a function of temperature ranging from 200 °C to 500 °C of the as-prepared $Y(OH)_3$ powder. The numbers in (b) indicate the dehydration percentage for $Y(OH)_3$. These valuee were calculated using the ratio of weight loss after 2 h at a specific temperature in (b) to the weight loss at 600 °C (it is considered that a complete dehydration of $Y(OH)_3$ occurs at600 °C as shown in in (a)).

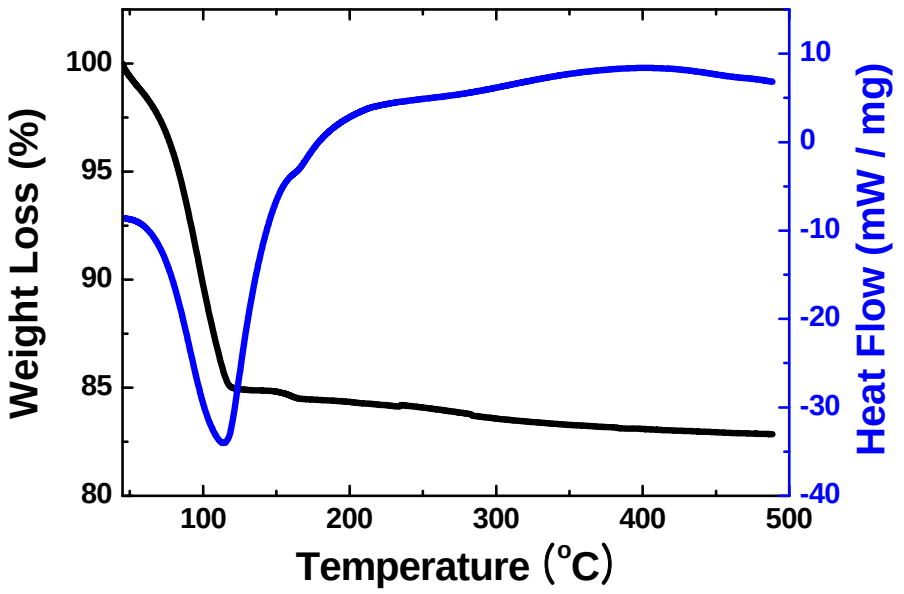


Fig. S4. Thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC) of $Zn(OH)_2$ powder.

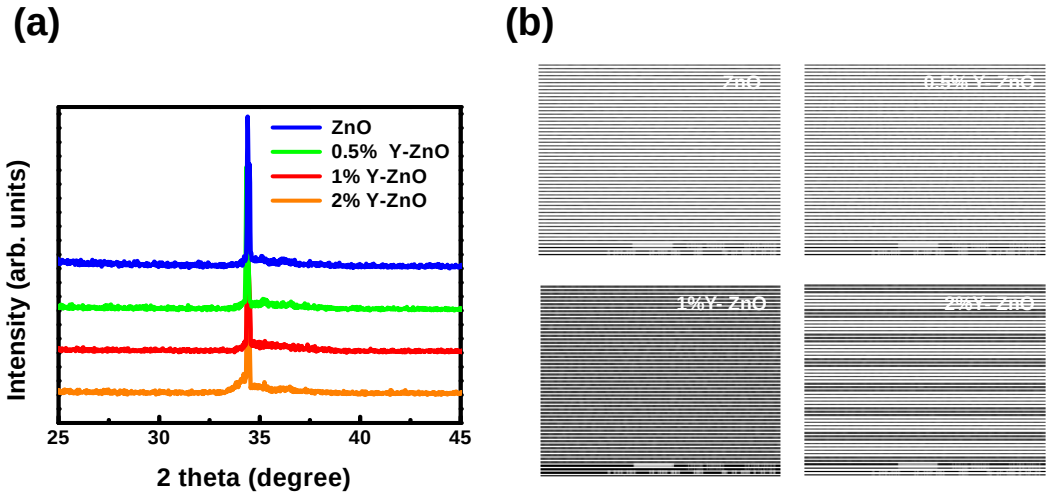
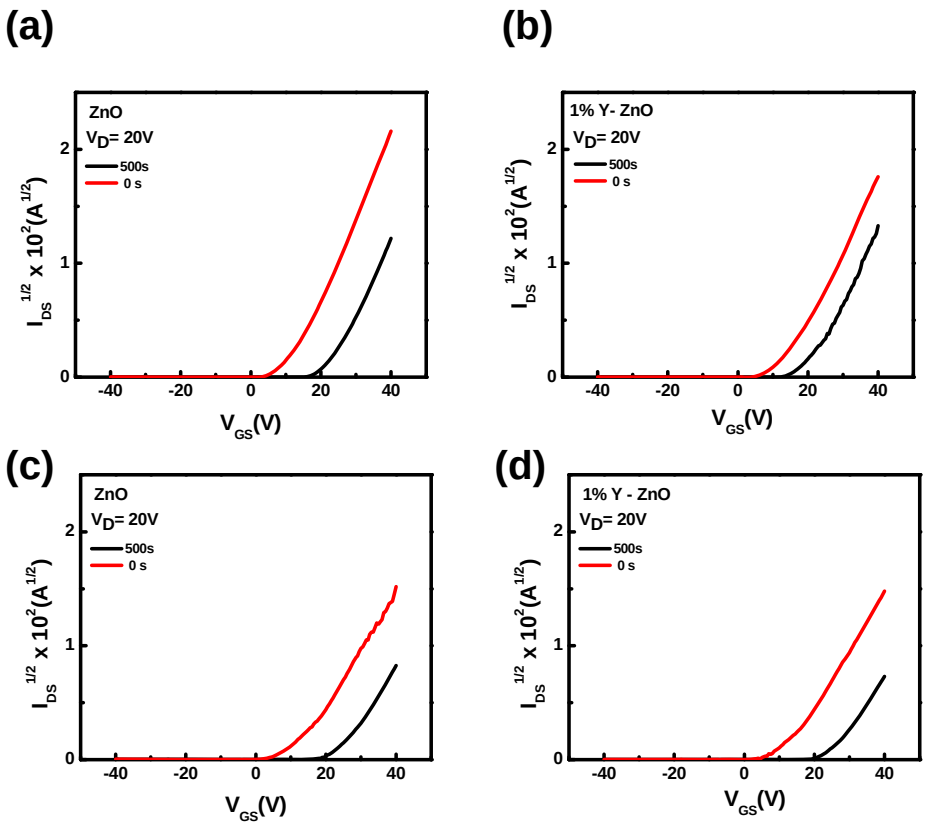


Fig. S5. (a) XRD patterns of ZnO and YZO films deposited on silicon substrate. Film thickness was ~ 150 nm. **(b)** Representative SEM top-view images of ZnO and YZO films as a function of Y doping concentration. Scale bar = 100 nm.



Y doped mol ratio	Temperature (°C)	Mobility ($cm^2V^{-1}s^{-1}$)	Threshold voltage (V)	ΔV_{th} (V)
0% Y-ZnO	300	1.57	7.11	11.4
1% Y-ZnO	300	1.43	6.92	4.8
0% Y-ZnO	250	0.91	8.27	12.7
1% Y-ZnO	250	0.82	8.41	13.8

Fig. S6. The $\sqrt{I_D}$ vs V_G plot to extract the threshold voltage shift for the spin-coated YZO-TFTs fabricated on SiO_2/n^+-Si substrates as a function of Y doped ratio. **(a)** and **(b)** samples were annealed at 300 °C. **(c)** and **(d)** samples were annealed at 250 °C. The bias instablity was analyzed under a positive bias stress.