Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Electronic supplementary information

High-mobility p-type NiO_x thin-film transistors processed at low temperatures with Al_2O_3 high-k dielectric

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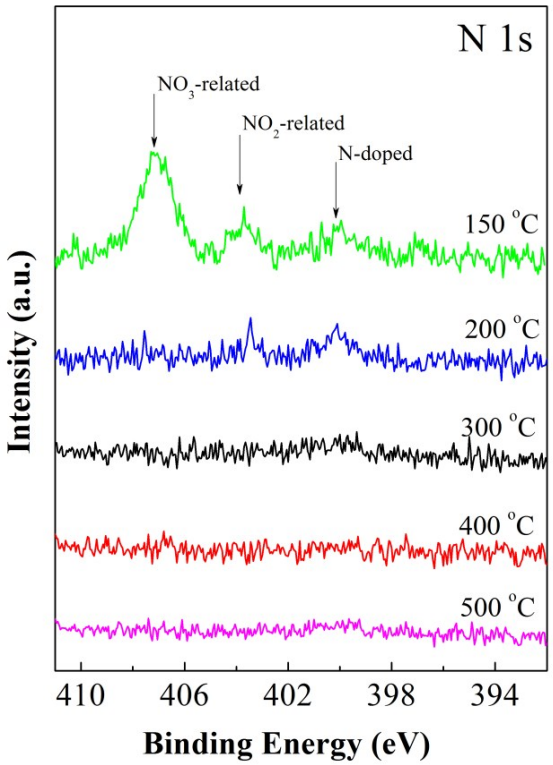

Fig. S1. The XPS spectra of N 1s peaks as a function of annealing temperature.

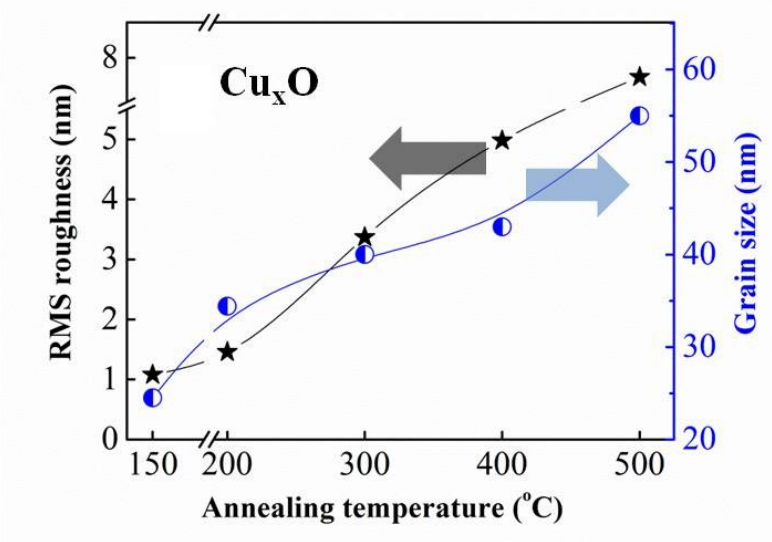

Fig. S2. The variation of RMS roughness and grain size at various annealing temperatures for Cu_xO thin films.

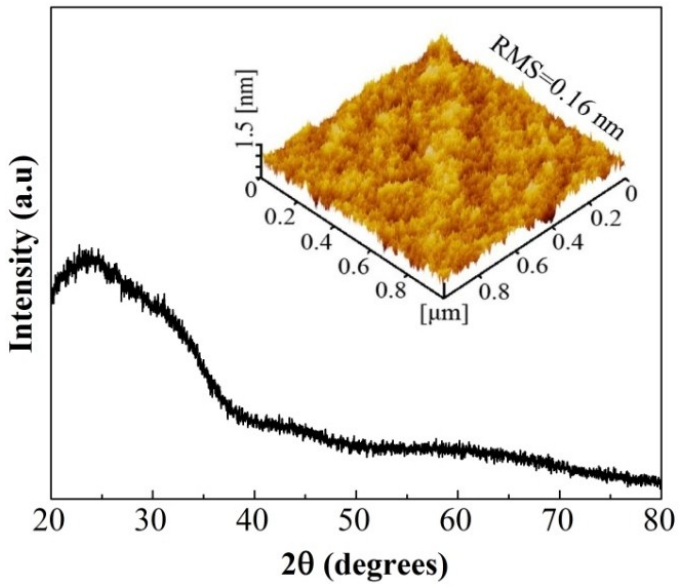

Fig. S3. XRD pattern of the WI AlO_x dielectric thin film. The inset shows the corresponding AFM image.

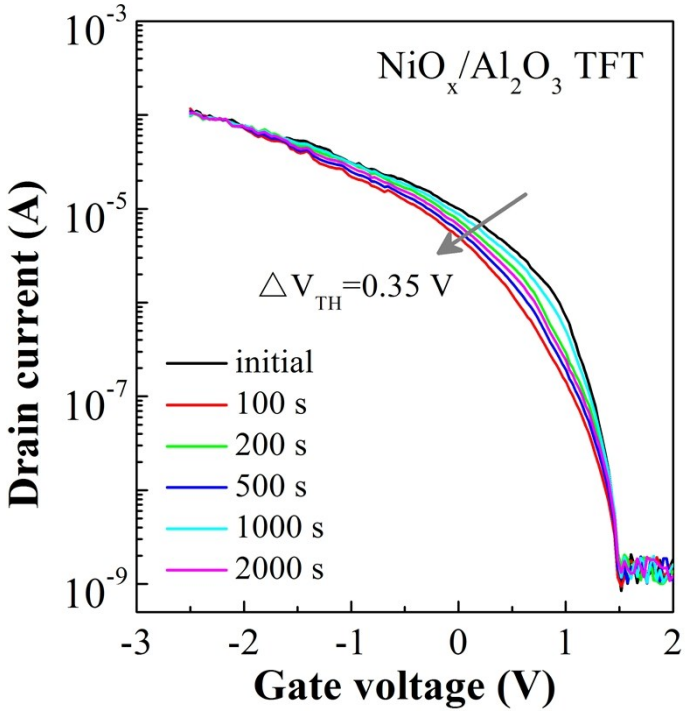

Fig. S4. Variation of the transfer curves of high mobility NiO_x/Al_2O_3 TFT under NBS test for various time intervals.

Table S1. The thickness of Cu_xO and NiO_x thin films as a function of T_a.

	150 °C	200 °C	300 °C	400 °C	500 °C
Cu_xO	38 nm	31 nm	25 nm	22 nm	18 nm
NiO_x	33 nm	28 nm	21 nm	18 nm	15 nm

Table. S2. Recent advances in the development of solution-processed p-type oxide TFTs.

Method[a)]	Channel	Process temp. (°C)	$\mu_{h,FE}$ (cm^2/Vs)	I_{on}/I_{off}	V_g range (V)	Year	Ref.
SC	SnO	450	0.13	85	-70~30	2012	[1]
SC	Cu_2O	700	0.16	~10^2	-40~40	2013	[2]
SP	Cu_2O	275	10^{-4}-10^{-2}	4×10^3	-140~20	2013	[3]
IJ	Cu_xO	400	0.22	~10^3	-2~1	2015	[4]
SC	Cu_2O	600	0.29	~10^4	-30~10	2015	[5]
SC	CuO	300	0.8	~10^5	-3~2	2015	[6]
SC	Cu_xO	500	10^{-2}	~10^4	-30~30	2016	[7]
SC	Sn-NiO	280	0.97	~10^6	-7~1	2016	[8]
SC	NiO	300	4.4	~10^5	-2~0	2016	[9]
SC	NiO	300	14.7	10^4~10^5	-3.5~2	This work	

[a)] (SC: spin-coating, SP: spray pyrolysis, IJ: ink-jet).

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