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Supporting Information

Photoelectrochemical water splitting using WO_3 photoanodes: the substrate and temperature roles

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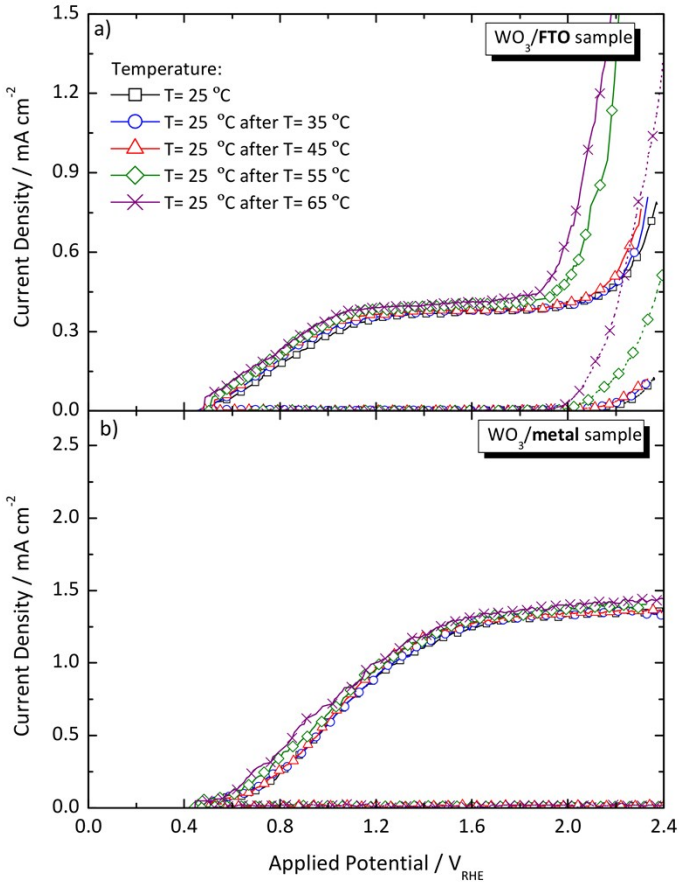

Fig. S1 Photocurrent density-voltage (*J*-*V*) characteristics of the WO_3 photoanodes: a) WO_3/FTO and b) WO_3/metal for reference tests performed at 25 °C between experiments and before increasing the temperature of the cell; obtained in the dark conditions (dashed lines) and under 1 sun AM 1.5 G illumination conditions (solid lines). (□) T = 25 °C, (○) T = 35 °C, (△) T = 45 °C, (◇) T = 55 °C, (×) T = 65 °C.

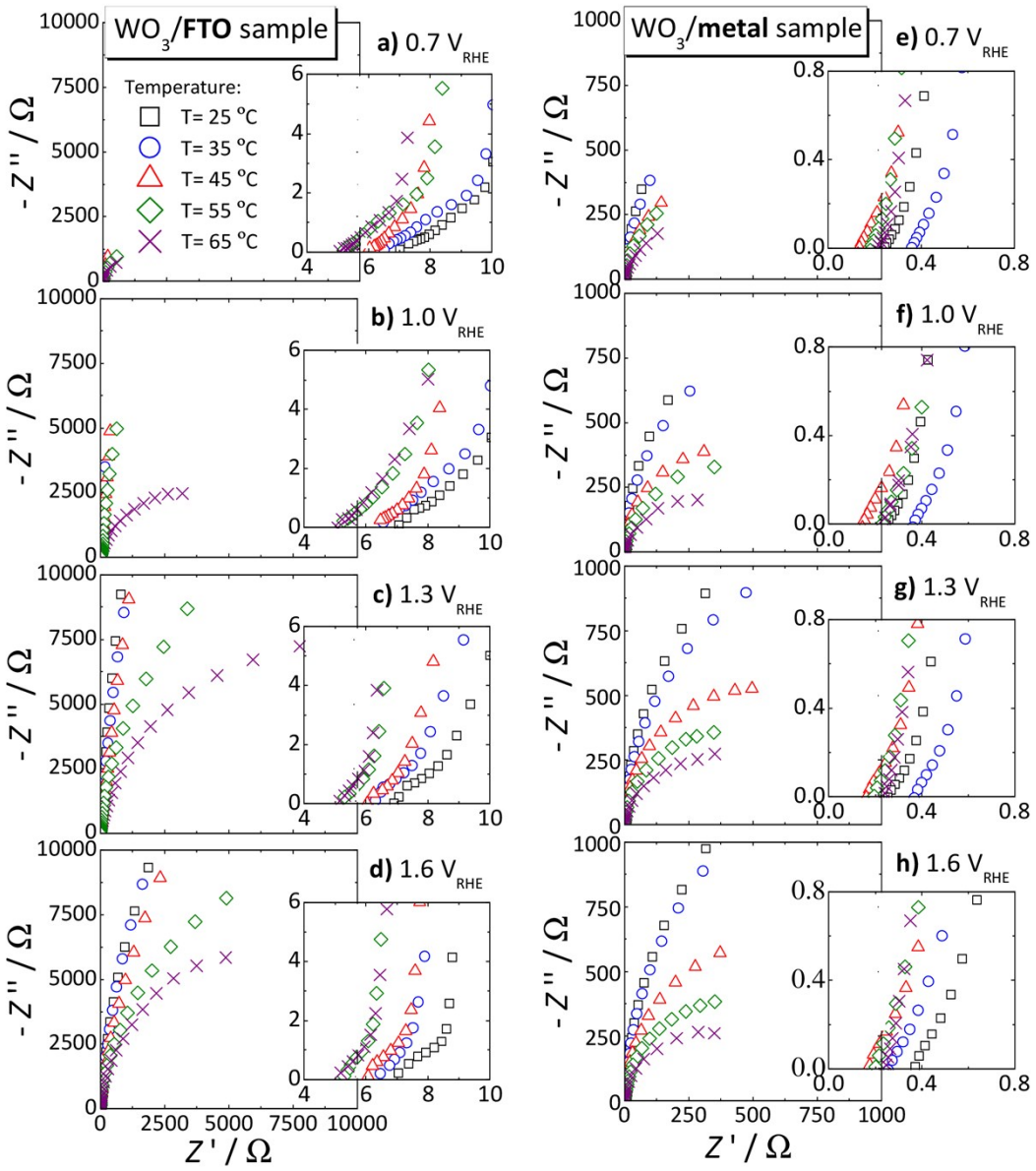

Fig. S2 Temperature effect in the Nyquist diagrams of the WO_3/FTO sample [left plots] and WO_3/metal sample [right plots]; obtained for a range of temperatures from 25 °C to 65 °C, in dark and forward biases: a) and e) 0.7 V_{RHE}; b) and f) 1.0 V_{RHE}; c) and g) 1.3 V_{RHE}; d) and h) 1.6 V_{RHE}. *Z* ': real impedance, *Z* '': imaginary impedance; (□) *T* = 25 °C, (○) *T* = 35 °C, (△) *T* = 45 °C, (◇) *T* = 55 °C, (×) *T* = 65 °C. On the right side of each plot is a zoom-out of the left side plots.

Table S1 Intrinsic power characteristics of the WO_3/FTO and WO_3/metal samples; J_{photo}, V_{photo}, *P*, *FF* and *ISTC* efficiency obtained at MPP.

Samples	*T* / °C	J_{photo} / mA cm^{-2}	V_{photo} / V_{RHE}	*P* / mW cm^{-2}	*FF* / %	*ISTC* / %
	25	0.34	1.30	0.44	63.54	0.23
	35	0.35	1.37	0.48	66.24	0.23
WO_3/FTO	45	0.42	1.36	0.57	72.69	0.28
	55	0.46	1.35	0.62	70.88	0.31
	65	0.59	1.09	0.64	65.24	0.36
	25	1.05	0.99	1.04	46.98	1.06
	35	1.09	1.11	1.21	48.08	1.11
WO_3/metal	45	1.28	1.12	1.43	49.57	1.31
	55	1.51	1.14	1.72	50.56	1.54
	65	1.95	1.13	2.20	50.84	2.38

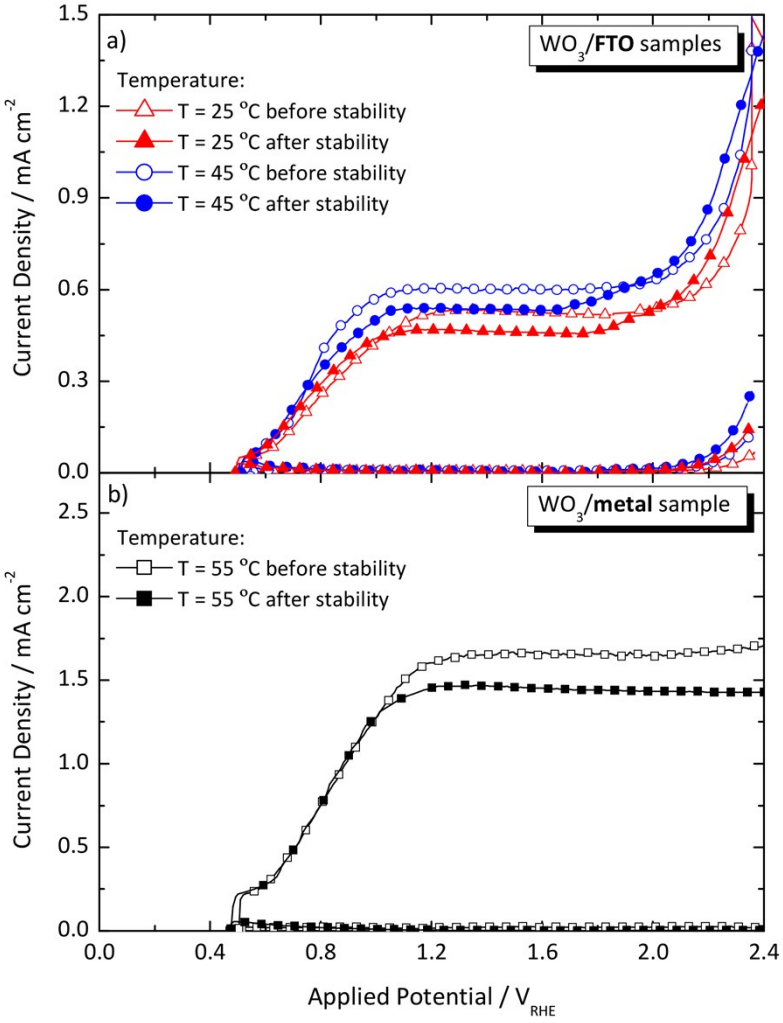

Fig. S3 Photocurrent density-voltage (*J*-*V*) characteristics of the WO_3 photoanodes tested in the dark (dashed lines) and under 1 sun AM 1.5 G illumination (solid lines) conditions, before and after stability test. a) WO_3/FTO samples: fresh cell at *T* = 25 °C (△) and at *T* = 45 °C (○), aged cell after 72 h of stability at *T* = 25 °C (▲) and at *T* = 45 °C (●); b) WO_3/metal sample: fresh cell at *T* = 25 °C (□) and at *T* = 55 °C (○), aged cell after 72 h of stability at *T* = 25 °C (■) and at *T* = 55 °C (●).