

# Supporting Information

## Hazy Al<sub>2</sub>O<sub>3</sub>-FTO Nanocomposites: A Comparative Study with FTO-Based Nanocomposites Integrating ZnO and S:TiO<sub>2</sub> Nanostructures

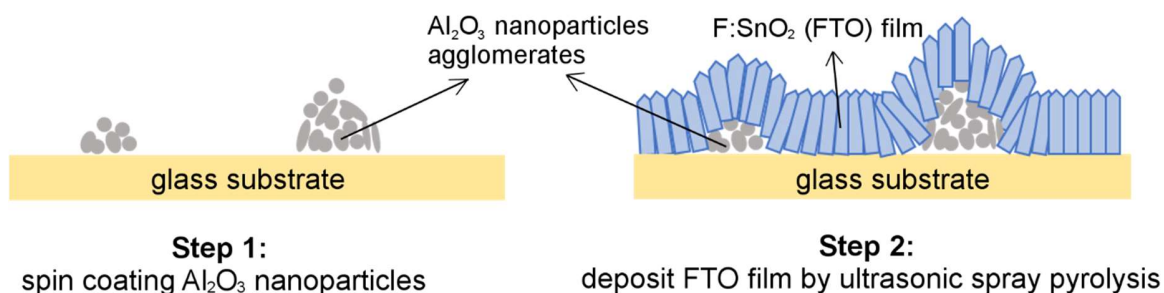
Shan-Ting Zhang<sup>1,2,\*</sup>, Guy Vitrant<sup>3</sup>, Etienne Pernot<sup>1</sup>, Carmen Jiménez<sup>1</sup>, David Muñoz-Rojas<sup>1</sup> and Daniel Bellet<sup>1,\*</sup>

<sup>1</sup> Université Grenoble Alpes, CNRS, Grenoble INP, LMGP, F-38000 Grenoble, France; etienne.pernot@grenoble-inp.fr (E.P.); carmen.jimenez@grenoble-inp.fr (C.J.); David.Munoz-Rojas@grenoble-inp.fr (D.M.-R.)

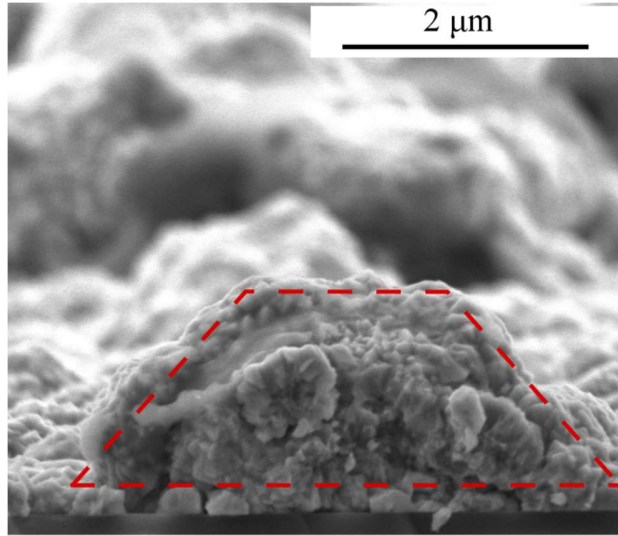
<sup>2</sup> Technische Universität Darmstadt, Jovanka-Bontschits-Strasse 2, Darmstadt 64287, Germany

<sup>3</sup> Université Grenoble Alpes, CNRS, Grenoble INP, IMEP-LAHC, F-38000 Grenoble, France; guy.vitran@minatec.grenoble-inp.fr

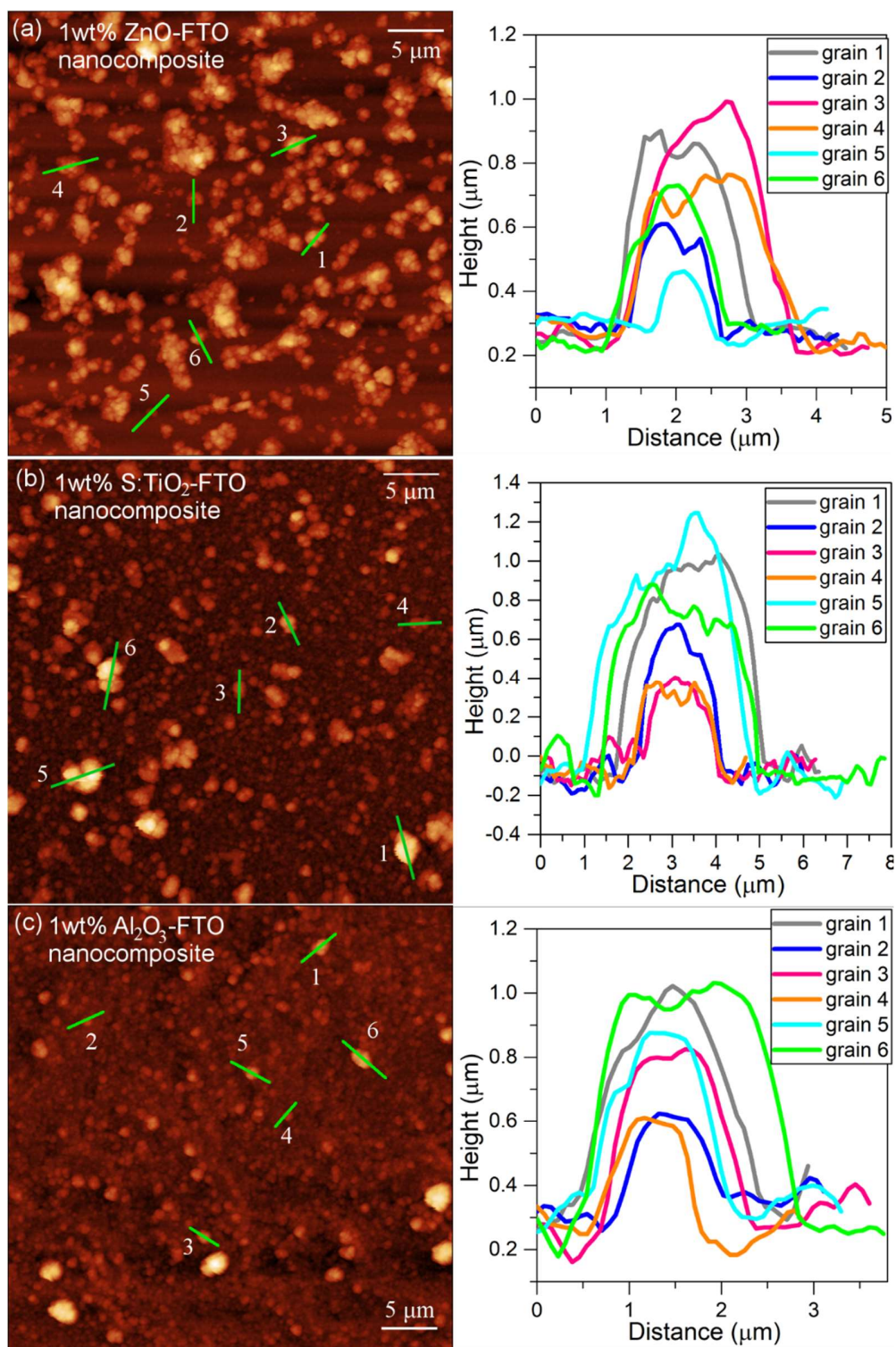
\* Correspondence: shanting.zhang@gmail.com (S.-T.Z.); daniel.bellet@grenoble-inp.fr (D.B.); Tel.: +33-4-56-52-93-37 (S.-T.Z. & D.B.)



**Figure S1:** Schematic drawing of the two-step process (not to scale) for fabricating Al<sub>2</sub>O<sub>3</sub>-FTO nanocomposites.



**Figure S2:** SEM image of a 1 wt % S:TiO<sub>2</sub>-FTO nanocomposite presenting the cross section of a nanoparticle agglomerate, which resembles and thus is approximated as a truncated circular pyramid.



**Figure S3:** (a) AFM image of a 1 wt % ZnO-FTO nanocomposite; right panel summarizes the height profiles of the six grains indicated; (b) AFM image of a 1 wt % S:TiO<sub>2</sub>-FTO nanocomposite; right panel summarizes the height profiles of the six grains indicated; (c) AFM image of a 1 wt % Al<sub>2</sub>O<sub>3</sub>-FTO nanocomposite; right panel summarizes the height profiles of the six grains indicated.

**Table S1:** The values of equivalent radius  $r_{eq}$  of the grains 1–12 marked in Figure 9 in the main text.

	$r_{eq}$ (nm)		$r_{eq}$ (nm)		$r_{eq}$ (nm)
grain 1	1800	grain 5	1060	grain 9	98.6
grain 2	1590	grain 6	919.5	grain 10	170.75
grain 3	1220	grain 7	881.7	grain 11	360.9
grain 4	1340	grain 8	610.9	grain 12	253.2