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Supplementary Information

Zinc diketonates as single source precursors for ZnO nanoparticles: Microwave-assisted synthesis, electrophoretic deposition and field-effect transistor device properties

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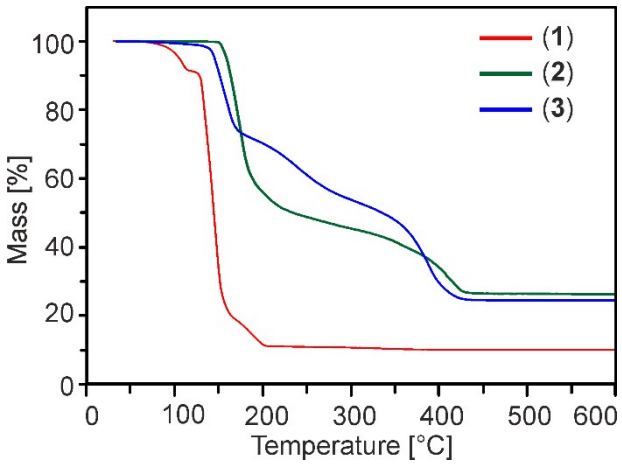

Figure S1: Thermogravimetric mass loss curve in air of the precursors (**1**)-(**3**).

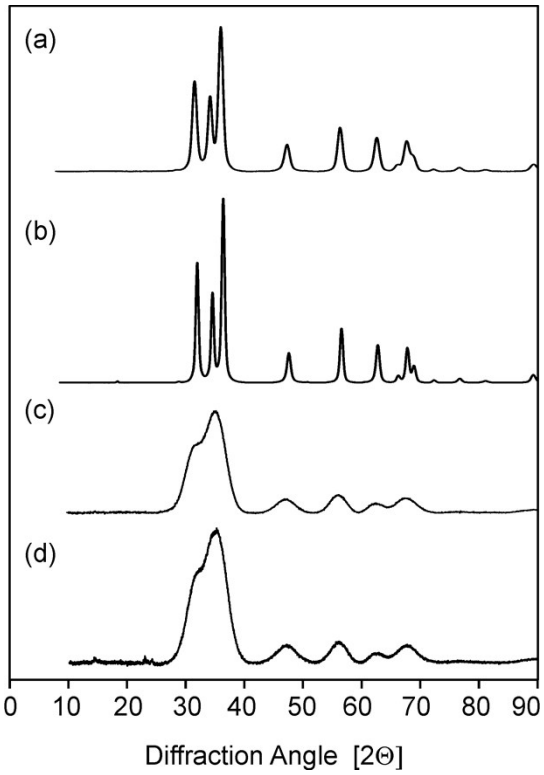

Figure S2: X-ray diffractograms of powders obtained by the decomposition the precursors (a-b) (**1**) and (c-d) (2) at 180 and 200 °C, respectively in 12.5 mM solutions in acetonitrile by microwave heating.

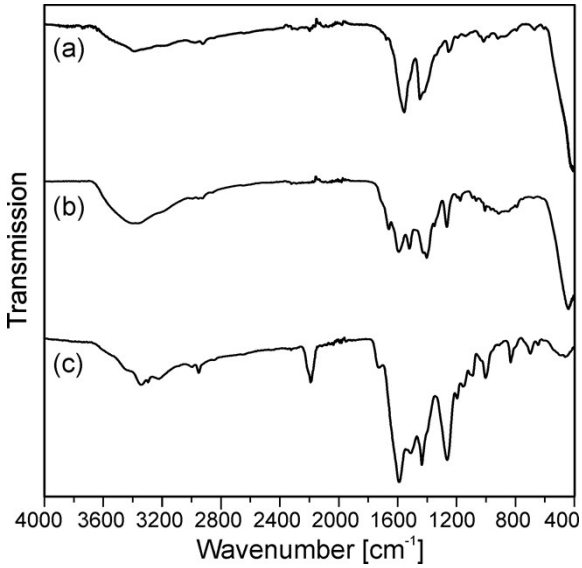

Figure S3: (a-c) IR spectra of powders obtained by the decomposition of the precursors (**1**)-(**3**) in acetonitrile (12.5 mM, 180 °C), respectively.

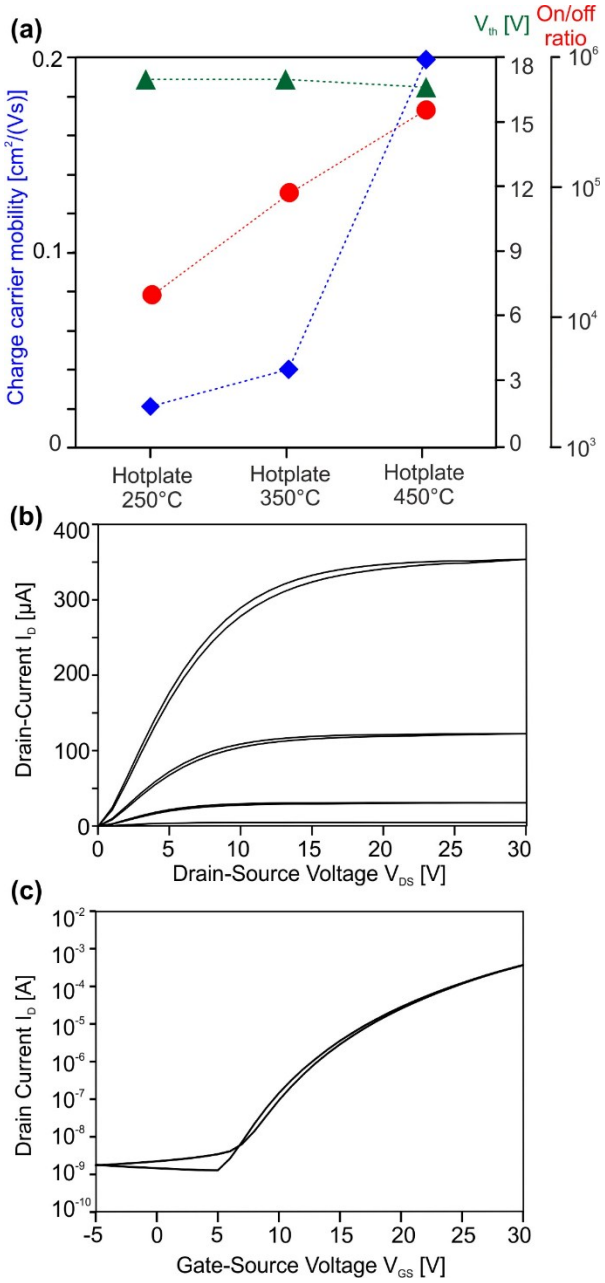

Figure S4: (a) Performance parameters of FETs with ZnO nanoparticles obtained from the microwave-assisted decomposition (12.5 mM, 180 °C) of precursor (**1**) and additional annealing at various temperatures in air. (b) Output characteristics of an FET fabricated by annealing at 450° C. Variation of the drain-source voltage from 0–30 V for gate-source voltages from 0–30 V in 5 V steps. Data were acquired for increasing as well as decreasing drain-source voltages. (c) Corresponding transfer characteristic for constant drain-source voltage of 25 V. (µ 0.20 $cm^2/(Vs)$, V_{th} +16.5 V, $I_{on/off}$ ratio ~ 750,000).

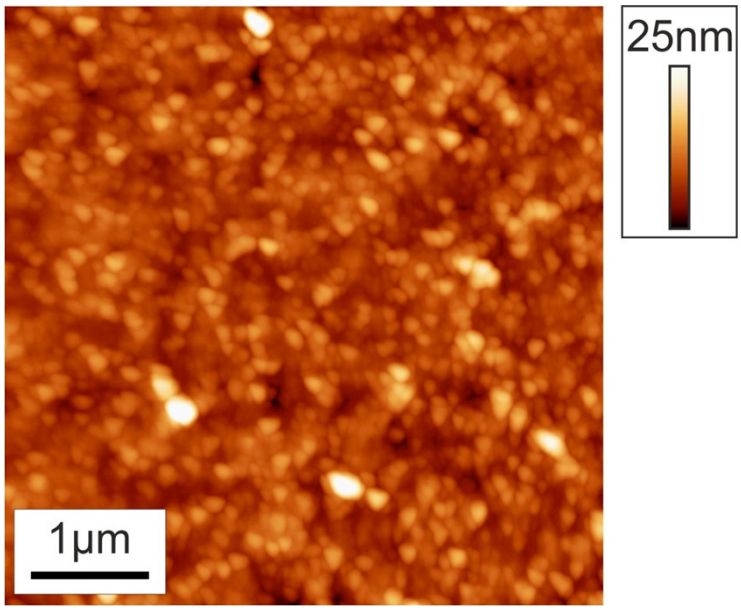

Figure S5: AFM top view of films of films of ZnO nanoparticles (12.5 mM, 180 °C) obtained from the microwave-assisted decomposition of precursor (**2**) and additional annealing at 250 °C in air. The image depicts the semiconducting layer in the FETs show in Fig. 9.

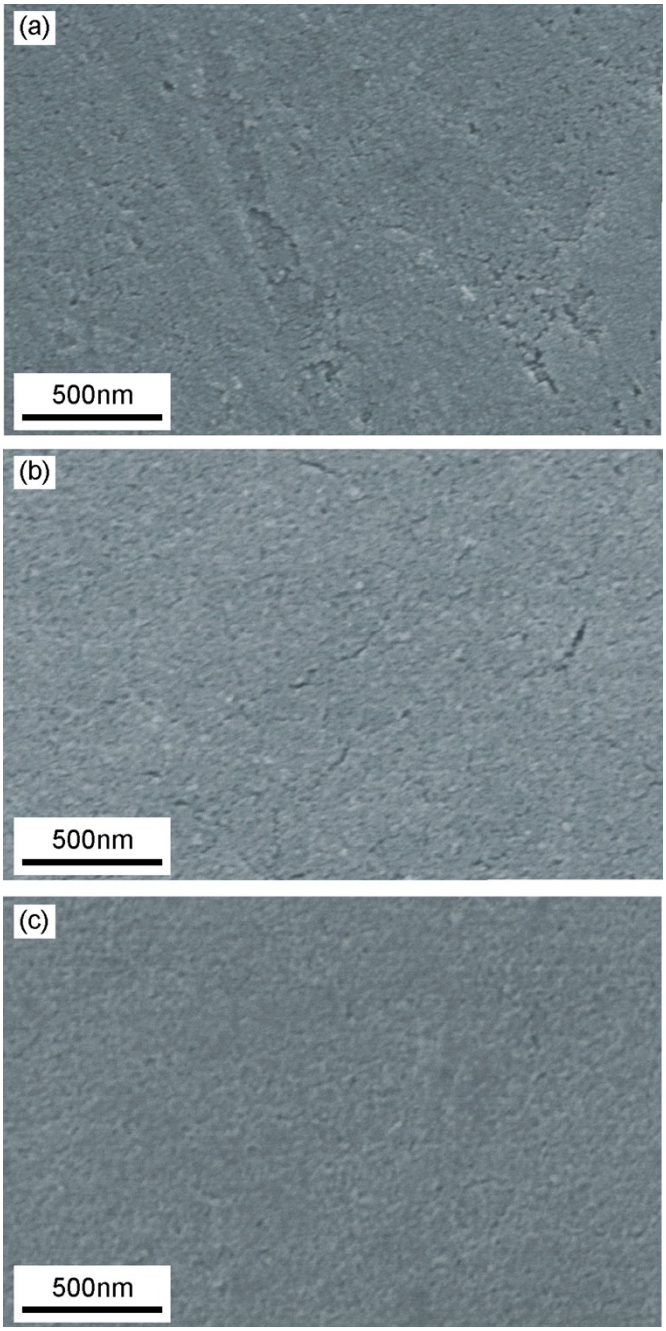

Figure S6: SEM micrographs of ZnO coatings obtained from the electrophoretic deposition from dispersions of the microwave-assisted decomposition of (**1**) in acetonitrile (25 mM, 180 °C) at (a) 20 V, (b) 30 V and (c) 40 V with a deposition time of 120 minutes in all cases.

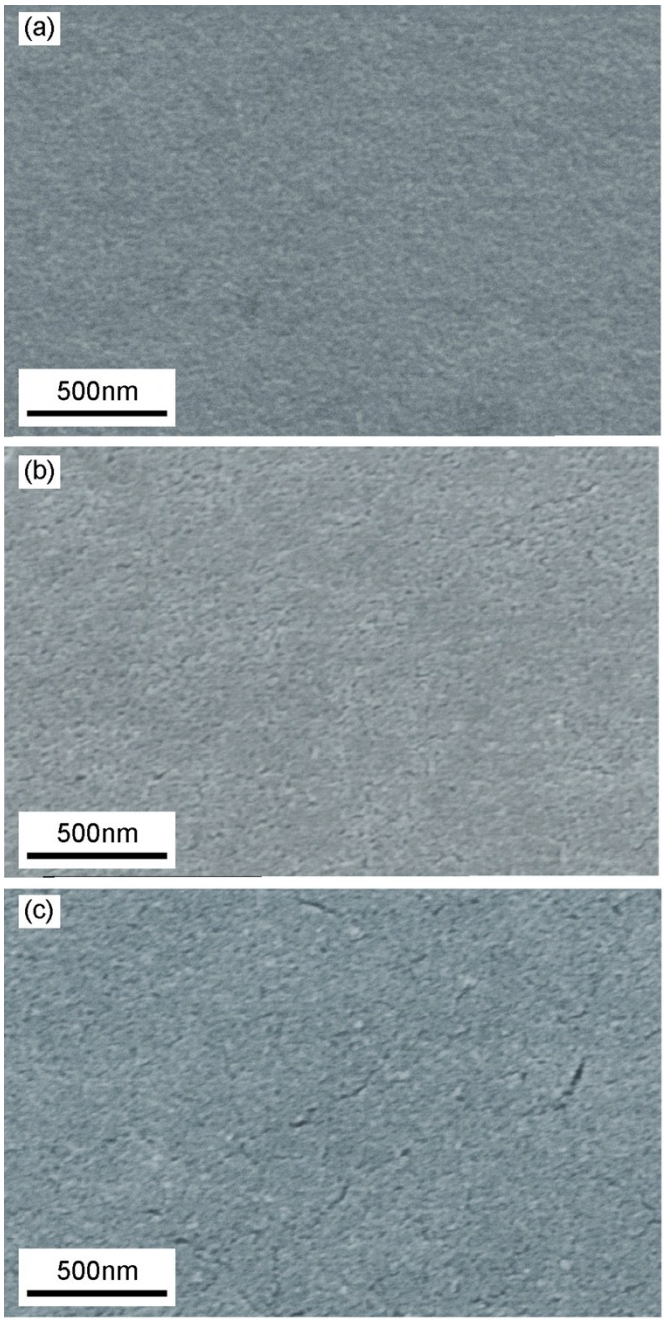

Figure S7: SEM micrographs of ZnO coatings obtained from the electrophoretic deposition from dispersions of the microwave-assisted decomposition of (**1**) in acetonitrile (25 mM, 180 °C) for (a) 30 min, (b) 60 min and (c) 120 min at a voltage of 30 V in all cases.

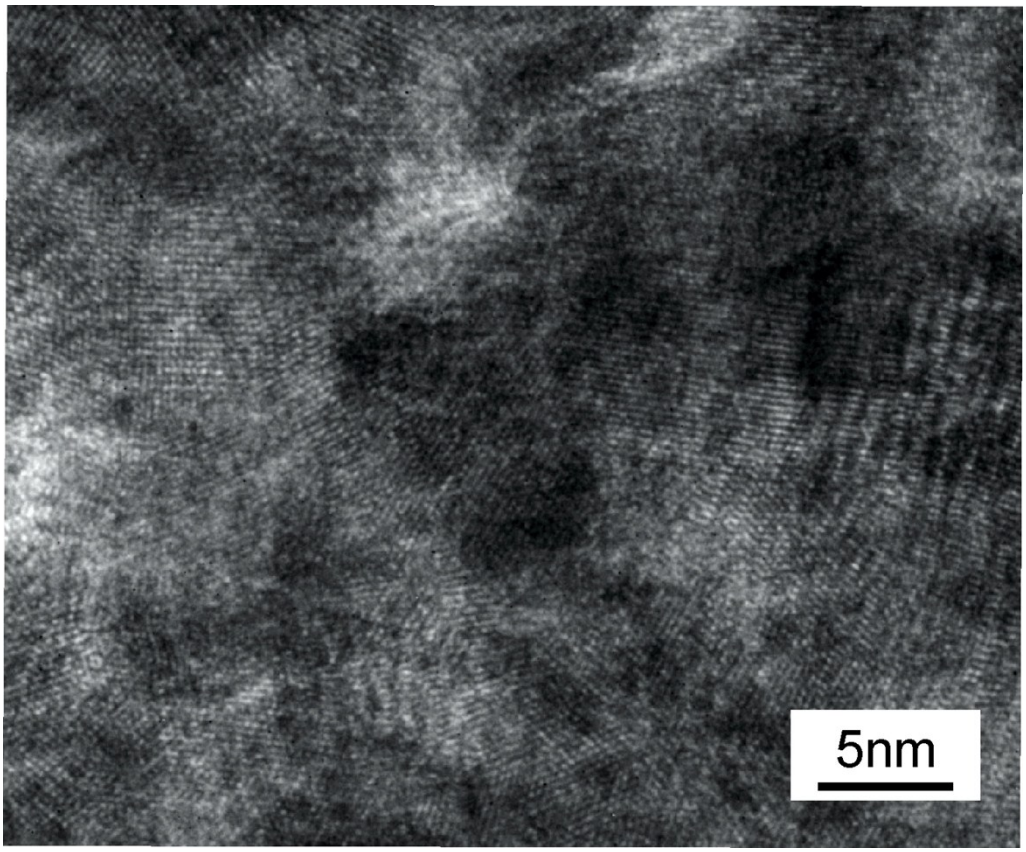

Figure S8: HRTEM image of the ZnO layer in a cross section prepared by FIB from ZnO films on ITO/glass substrates. The image corresponds the ZnO layer depicted in Figure 11.