

Supporting Information

(1) Lengthy experimental details. (2) AFM images of dense PS monolayer array, Ag precursor-coated PS monolayer, Ag precursor-coated quartz; (3) EDX spectra of ZnO nanowires grown on different Ag films; (4) XRD spectra of ZnO nanowires grown on different Ag films.

(1) Lengthy experimental details: Ag(hfa)-tetraglyme (Hhfa 1,1,1,5,5,5-hexafluoro-2,4-pentanedione; tetraglyme 2,5,8,11,14-pentaoxatetradecane) precursor has been dissolved in EtOH/H₂O 1:1 solution to obtain 0,1 M and 0.05 M concentrations, respectively. Two types of substrates have been prepared by 1) spin coating of Ag precursor solution on quartz substrates (h-Ag) and 2) spin coating of Ag on PS monolayers transferred on quartz substrates (ns-Ag). After spin coating the samples have been thermally treated for 30 min in MOCVD hot wall tubular reactor, under Ar flow (100 sccm, P= 1 Torr) at T=150°C. The PS colloids have been removed by 15 min sonication in toluene or by thermal calcination performed in situ during ZnO deposition.

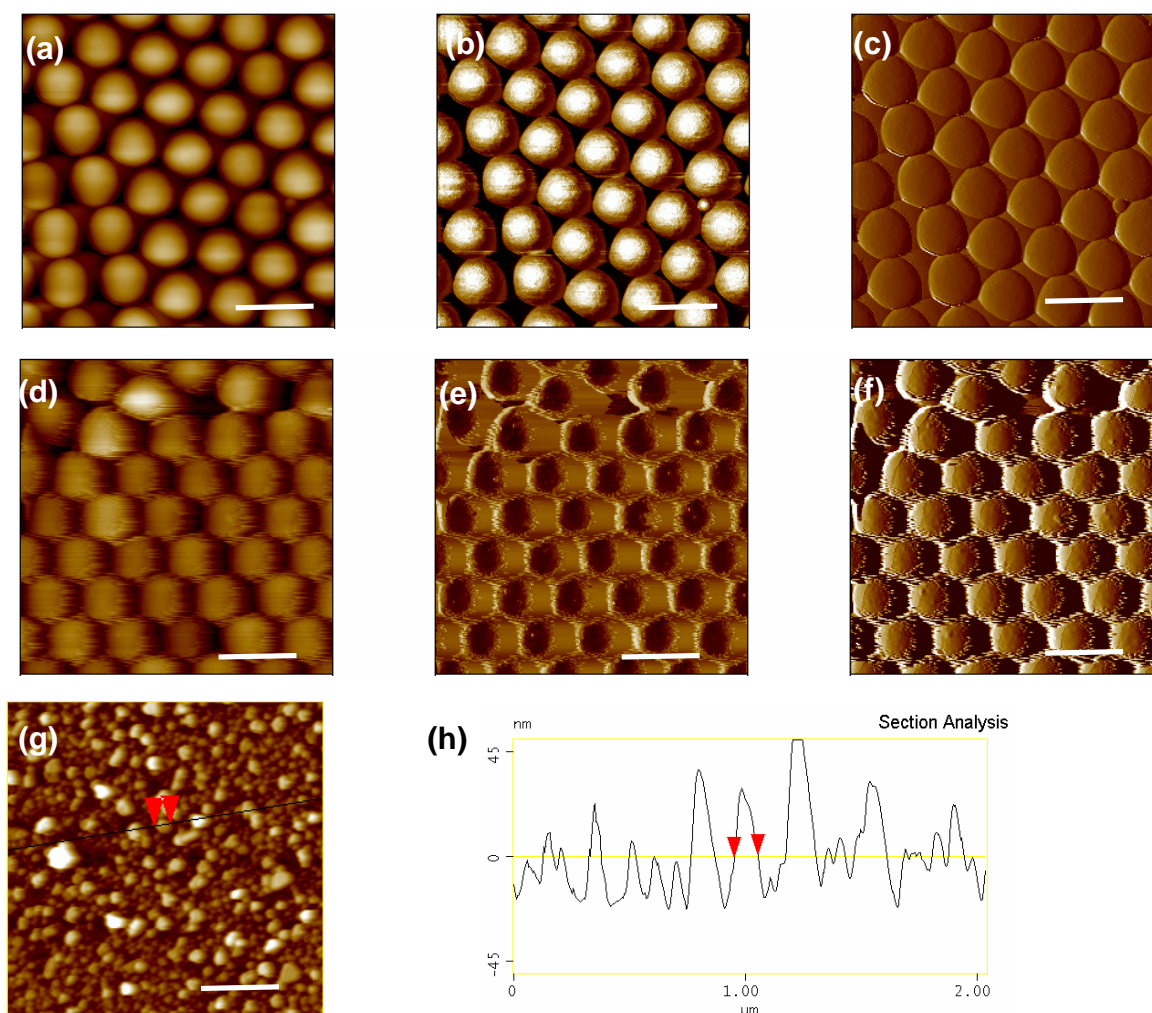
ZnO has been deposited on h-Ag (0.1 M) and ns-Ag (0,1 M) treated substrates by MOCVD, in hot wall tubular reactor, using a diamine (N,N,N',N'-tetramethylethylenediamine) adduct of zinc bis-2 thenoyl-trifluoroacetate [Zn(tta)₂· tmeda]. Deposition conditions are optimized using growth temperature of 600 °C and Ar (150 sccm) and O₂ (150 sccm) as carrier and reactive gas respectively. Deposition time was 70 min.

Nano-patterning effect has been observed on ns-Ag (0,05 M) using milder ZnO deposition conditions (500°C , 30 min).

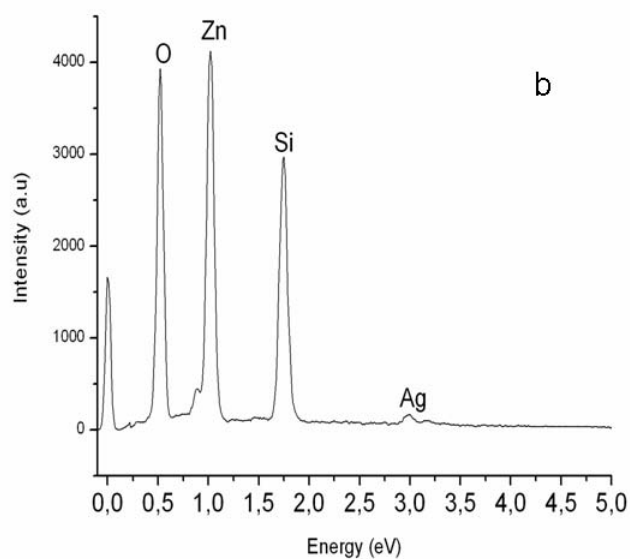
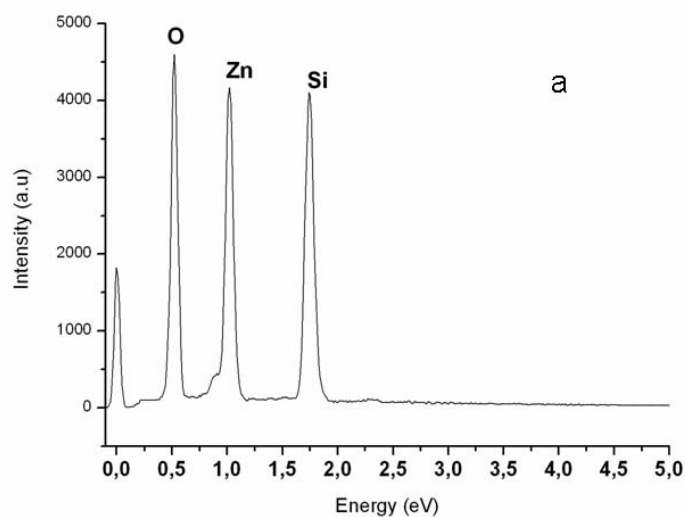
The deposited layers have been characterized by θ -2 θ X-ray diffraction (XRD) patterns measurements, recorded on a Bruker-AXS D5005 θ - θ X-ray diffractometer, using Cu-K α radiation operating at 40 KV and 30 mA current. Film surface morphologies have been investigated using a LEO Supra 55VP field emission gun scanning electron microscope (FEG-SEM). The atomic composition of the films was analyzed by energy dispersive X-ray analysis (EDX) using an Oxford solid state detector. AFM analysis has been performed on Multimode Nanoscope IIIA (VEECO), operating in tapping mode in air with a

standard phosphorus n doped silicon tip, with a nominal constant force of 50 N/m. Images were recorded by using height, phase-shift and amplitude channels with 512x512 measurement points (pixels). Measurements were made twice or three times on different zones of each sample. Image processing was performed by using the Nanoscope III software.

(2) Figure S1-Supporting information. (a-f): AFM images of height (left hand side, $z=200$ nm), phase (centre, $z=60^\circ$) and amplitude (right hand side, $z=1$ V) of dense PS monolayer array (upper panels) and Ag precursor-coated PS monolayer (lower panels). (g) Height image ($z=100$ nm) and corresponding section analysis (h) for Ag spin coated on bare quartz. Bar = 500 nm.



(3) Figure S2-Supporting information. (a) EDX spectrum of ZnO nanowires grown on ns-Ag substrate. The EDX analysis confirms the presence of ZnO. Spectrum shows the presence of the Zn L peak at about 1.010 KeV (together with the Si substrate contribution). The use of the “windowless” EDX detector allowed the detection of the O K α peak at 0.560 KeV and the exclusion of any S and/or F contamination, thus ruling out any sulphide and/or fluoride phase. No Ag peak has been detected. (b) EDX spectrum of ZnO nanowires grown on h-Ag substrate. The EDX analysis shown together with Zn, O and Si peaks a small Ag peak.



(4) Figure S3 -Supporting information. XRD analysis of ZnO nanoholes deposited on ns-Ag. The patterns confirms the formation of ZnO crystalline phases showing a preferential 002 orientation. This orientation, (preferential also in the nanostructured ZnO layers deposited with the same precursor without catalyst), is not predominant when long nanowires structures are formed.

