Supporting Information

All-inorganic Perovskite $CsPbBr_3$-Based Self-Powered Light-Emitting Photodetectors with ZnO Hollow Balls as an Ultraviolet Response Center

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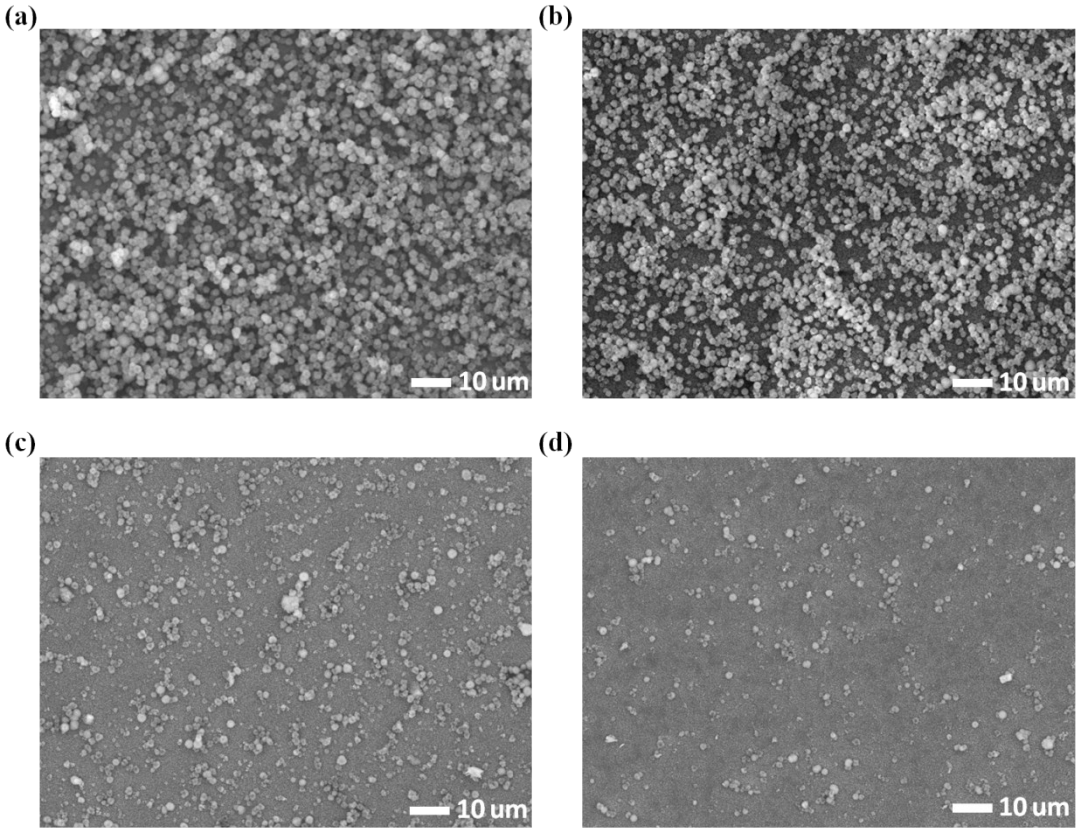
(a)
10 um
(b)
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(c)
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(d)
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Figure S1 The top view of SEM images of ZnO microspheres with different times dilution: (a) 5 times, (b) 6 times, (c) 7 times, (d) 8 times.

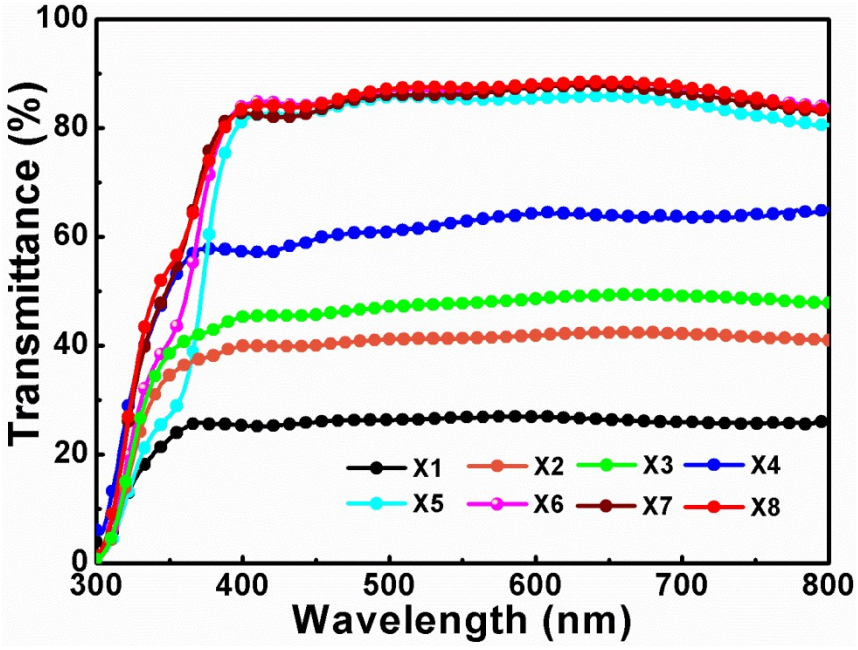

Figure S2 Transmittance of the ZnO microspheres with different times dilution.

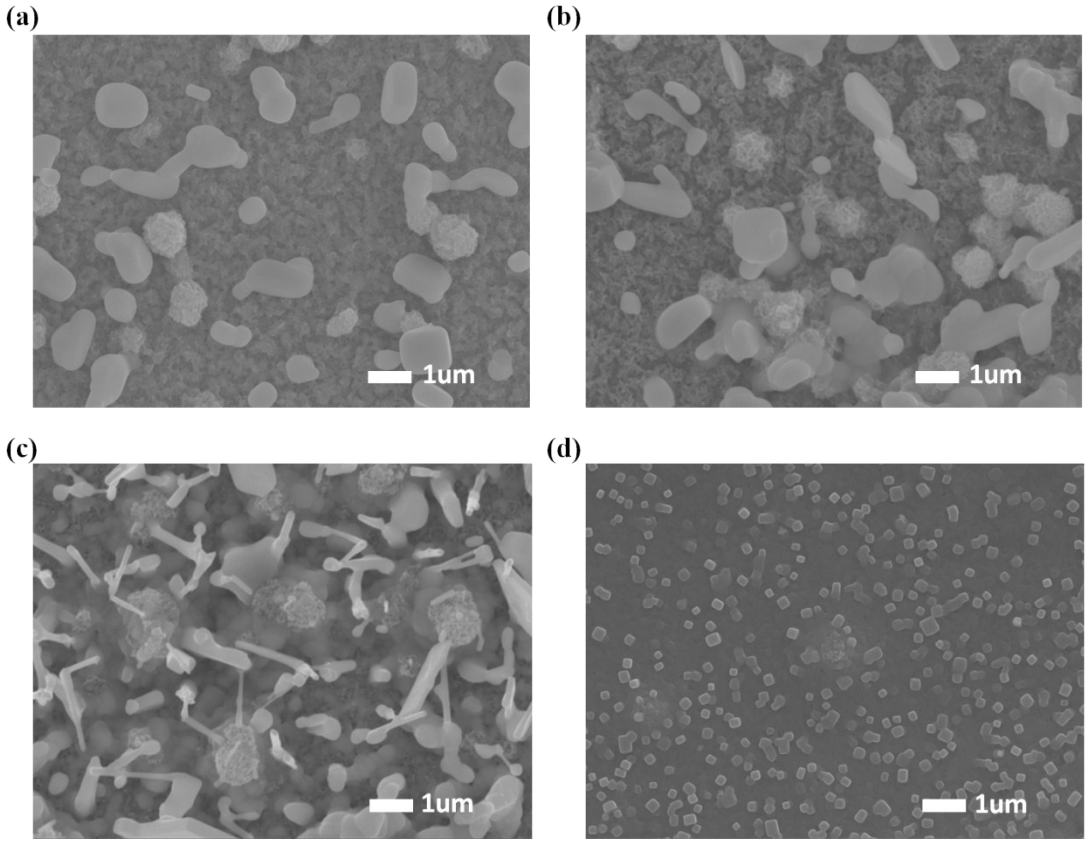

Figure S3 The top view of SEM images of all-inorganic perovskite $CsPbBr_3$ prepared from different concentration of $PbBr_2$ film: (a) 0.5M, (b) 0.75M, (c) 1.25M,and (d) 1.5M.

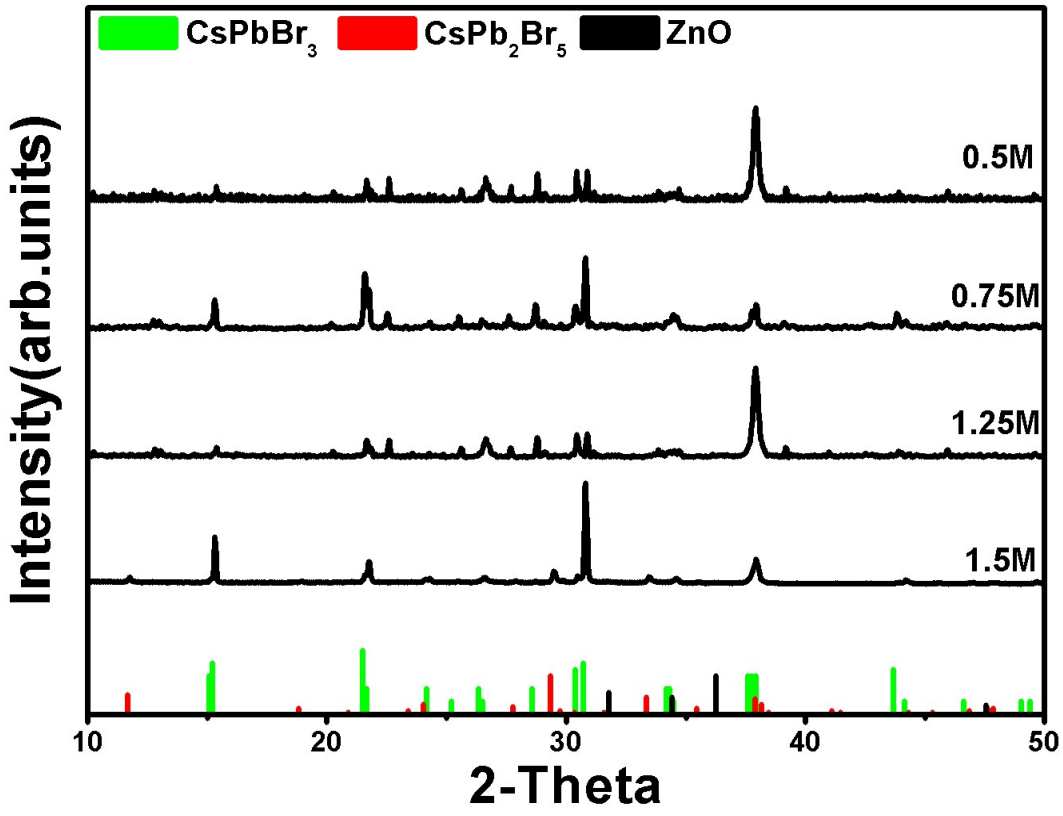

Figure S4 The XRD pattern of all-inorganic perovskite $CsPbBr_3$ prepared from various concentration of $PbBr_2$ film.

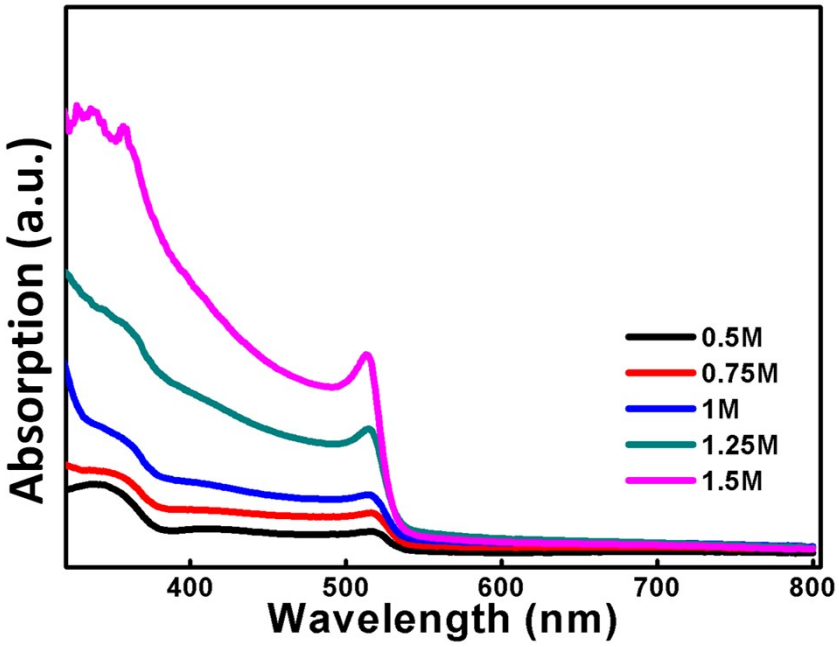

Figure S5 The absorption spectra of all-inorganic perovskite $CsPbBr_3$ prepared from various concentration of $PbBr_2$ film.

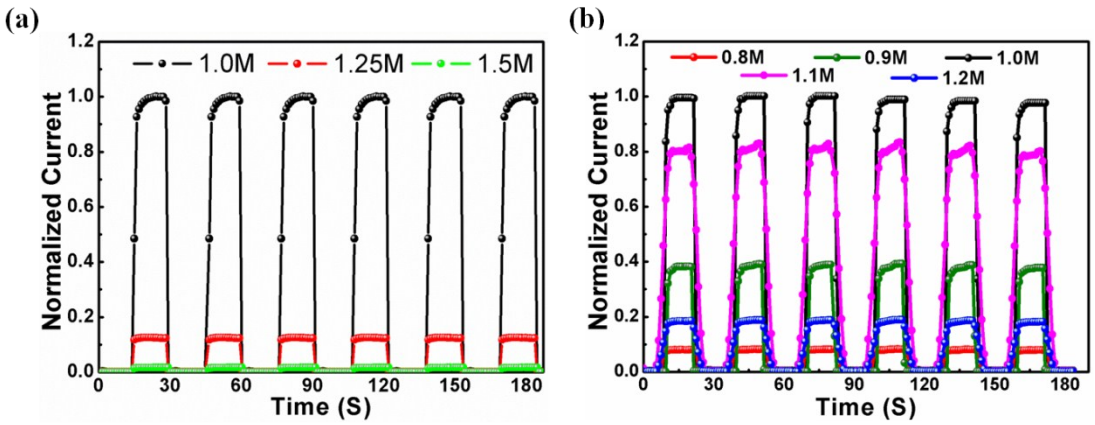

Figure S6 The light response characteristic of ZnO/$CsPbBr_3$/GaN structure devices, where $CsPbBr_3$films were prepared from different concentration of $PbBr_2$ film: (a)1.0M、1.25M、1.5M and (b)0.8M、0.9M、1.0M、1.1M、1.2M.

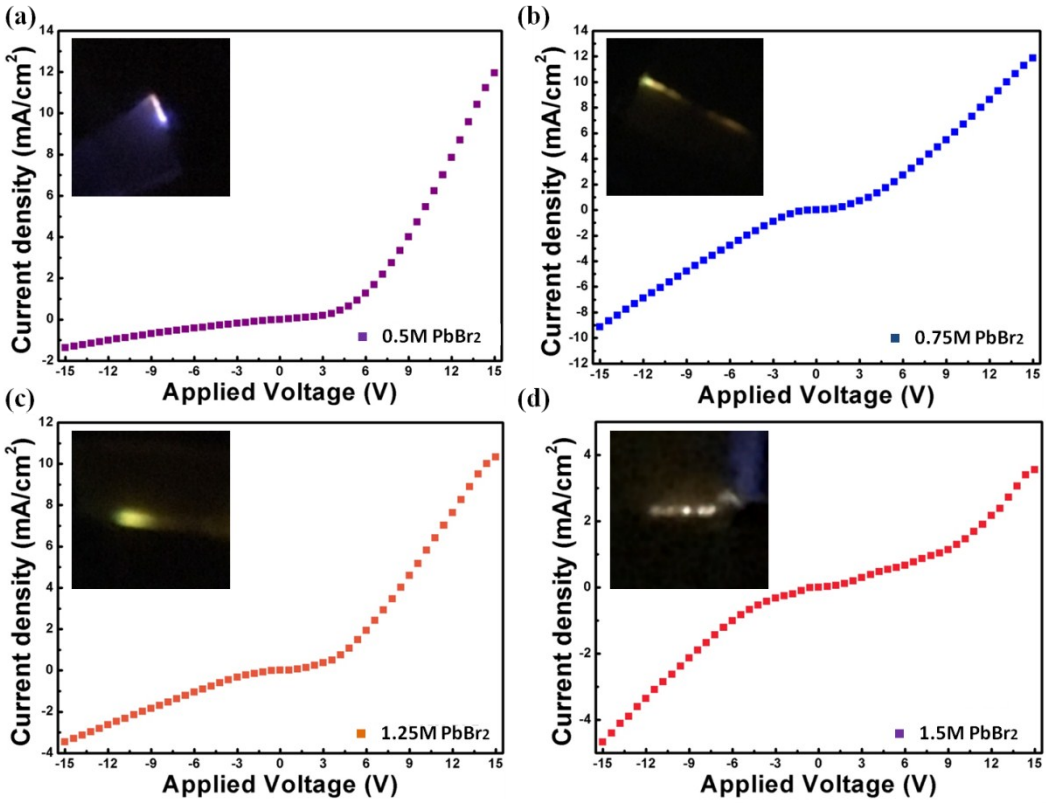

Figure 7 I-V characteristics of the LED device based on the heterojunction ZnO/$CsPbBr_3$/GaN, where $CsPbBr_3$films were prepared from different concentration of $PbBr_2$ film: (a) 0.5M, (b) 0.75M, (c) 1.25M and (d) 1.5M. The Insert is the photo taken from the corresponding device under a forward bias voltage of 15 V.

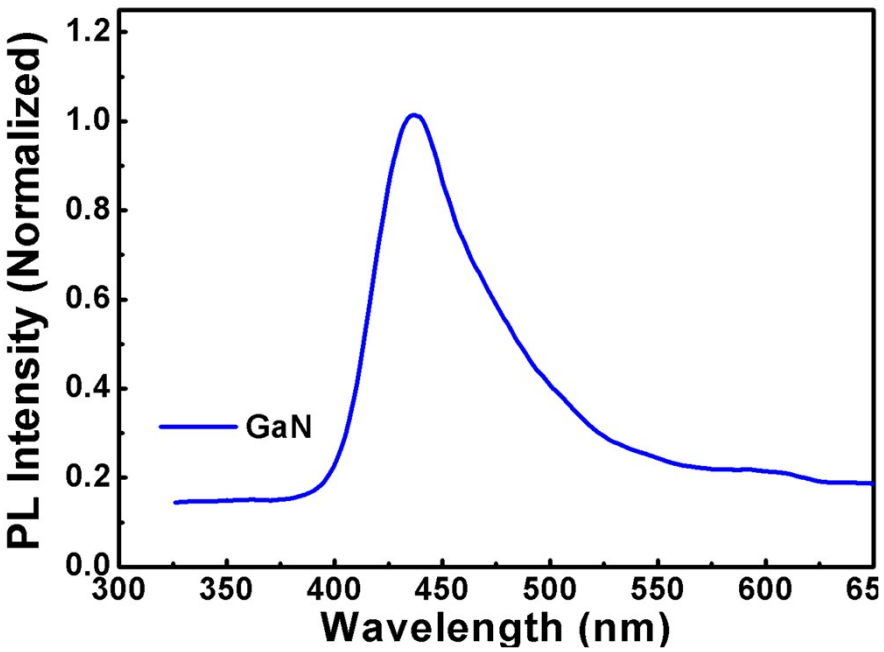

Figure S8 The PL spectra of GaN.

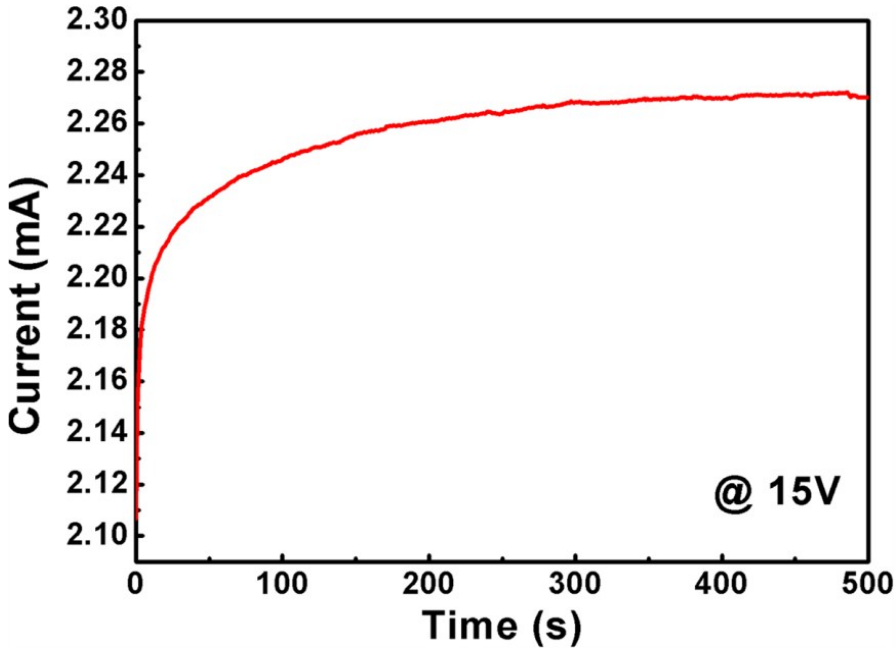

Figure S9 The stability of ZnO/$CsPbBr_3$/GaN structure devices under the forward voltage at 15 V for 5 min.

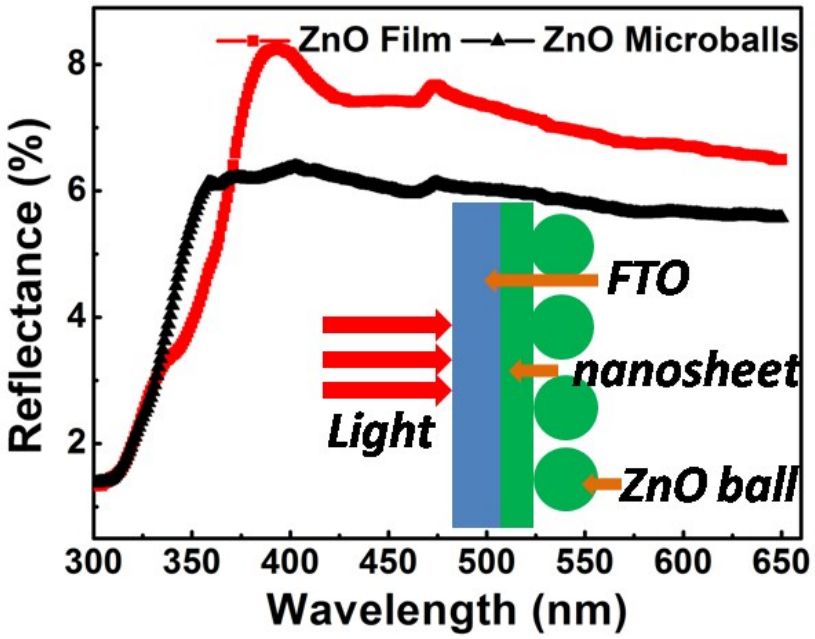

Figure S10 The reflectance of ZnO film and micro-balls on FTO substrate. Insert: light transmission for testing illustration.

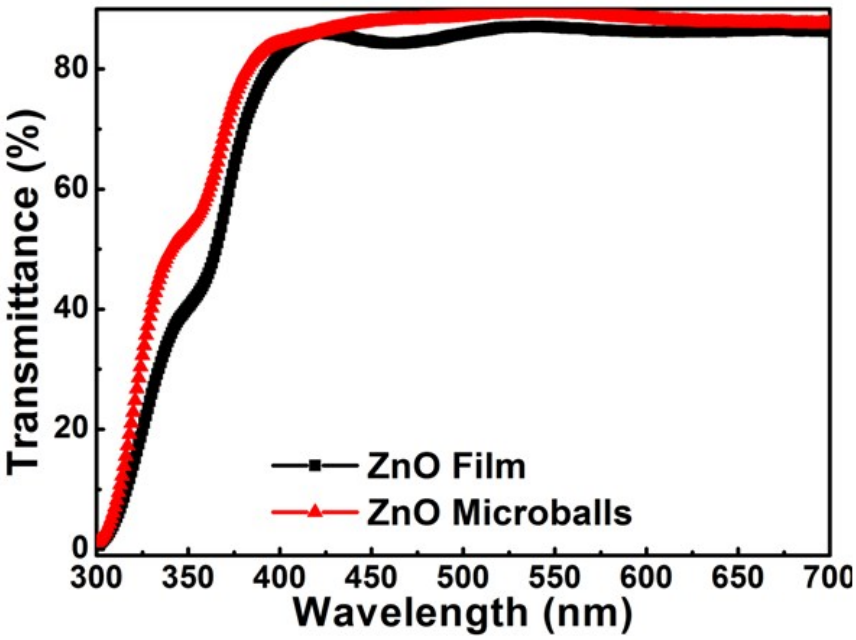

Figure S11 The transmittance of ZnO film and micro-balls on FTO substrate.