Supplementary information

Arrays of Nanorods Composed of ZnO Nanodots Exhibiting Enhanced UV Emission and Stability

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Suggested reaction scheme for the chemical processes occurring in this work:

Formation of ZnO nanorods (NRs):

\[ \text{Zn}^{2+} + 2\text{OH}^- \leftrightarrow \text{ZnO} + \text{H}_2\text{O} \quad (1) \]

Condensation reaction to form ZnO nanodots (NDs):

\[ \equiv\text{Zn}–\text{OH} + \text{OH}–\text{Zn}≡ \leftrightarrow \equiv\text{Zn}–\text{O}–\text{Zn}≡ + \text{H}_2\text{O} \quad (2) \]

Silica formation from TEOS:

Hydrolysis:

\[ \equiv\text{Si}–\text{OR} + \text{H}_2\text{O} \leftrightarrow \equiv\text{Si}–\text{OH} + \text{ROH} \quad (3) \]

Condensation:

\[ \equiv\text{Si}–\text{OH} + \text{HO}–\text{Si}≡ \leftrightarrow \equiv\text{Si}–\text{O}–\text{Si}≡ + \text{H}_2\text{O} \quad (4) \]

Condensation yielding an alcohol:

\[ \equiv\text{Si}–\text{OR} + \text{HO}–\text{Si}≡ \leftrightarrow \equiv\text{Si}–\text{O}–\text{Si}≡ + \text{ROH} \quad (5) \]

Condensation reaction to form a passive surface with the ZnO NDs:

\[ \equiv\text{Zn}–\text{OH} + \text{OH}–\text{Si}≡ \leftrightarrow \equiv\text{Zn}–\text{O}–\text{Si}≡ + \text{H}_2\text{O} \quad (6) \]
Figure S1. (a) TEM and (b) HRTEM images of ZnO NRs treated with 50 μL of TEOS.

Figure S2. Diameter distribution of the ZnO NDs inside the ZnO/SiO₂ NRs.
Figure S3. PL spectra of as-grown ZnO NRs and of NRs after O₂ and Ar plasma treatment.

Figure S4. PL spectra of as-grown ZnO NRs and of NRs after annealing in O₂ and Ar.
Figure S5. Plot showing the time dependence of the relative UV emission intensity of the as-grown ZnO NRs and the TEOS-treated ZnO NRs immersed in an aqueous buffer solution at pH = 9.18.

Figure S6. PL spectra of as-grown ZnO NRs and of the silica powder formed by hydrolysis and condensation of TEOS.
Figure S7. PL spectra of SiO$_2$ powder formed by hydrolysis and condensation of TEOS recorded at room temperature and after annealing in O$_2$ at 300, 600 and 900 °C.