Lattice Restraint Induced Ultra-large Bandgap Widening of ZnO Nanoparticles

An Xie, a Dandan Yang, b Xiaoming Li, a,b Haibo Zeng b

a. School of Materials Science and Engineering, Key Laboratory of Functional Materials and Applications of Fujian Province, Xiamen University of Technology, Xiamen 361024, China, E-mail: anxie@xmut.edu.cn

b. MIIT Key Laboratory of Advanced Display Materials and Devices, Institute of Optoelectronics & Nanomaterials, College of Materials Science and Engineering, Nanjing University of Science and Technology, Nanjing 210094, China. E-mail: lixiaoming@njjust.edu.cn
Fig. S1. XRD patterns of ZnMgO nanoparticle alloys prepared with different precursors and nominal Mg concentrations. (a) Zn(St)$_2$+Mg(St)$_2$, (b) Zn(St)$_2$+Mg(acac)$_2$, (c) Zn(acac)$_2$+Mg(acac)$_2$, (d) Zn(acac)$_2$+Mg(St)$_2$. 
Fig. S2. Absorption spectra of ZnMgO nanoparticle alloys prepared with different precursors and nominal Mg concentrations. (a) Zn(St)$_2$+Mg(St)$_2$, (b) Zn(St)$_2$+Mg(acac)$_2$, (c) Zn(acac)$_2$+Mg(acac)$_2$, (d) Zn(acac)$_2$+Mg(St)$_2$. 
Fig. S3. XRD pattern of Be-0.2Mg-MB70 sample.
Fig. S4. Normalized absorption curves of samples with different Be concentration at a 60% nominal Mg concentration.
Fig. S5. PL spectra of samples with different Mg nominal concentrations.
Fig. S6. Calculated $E_g$ values and emission peak energies as a function of Mg nominal concentration. The Be to Mg ratio is 0.4.