Electronic Supplementary Information

Ultra-Stable $CsPbBr_3$ Nanocrystals with Lead-Carboxylate/SiO_2 Encapsulation for LED Application

Yixuan Liu, Lulu Zhang, Xuemi Long, PanPan Jiang, Chong Geng*, Shu Xu*

State Key Lab of Reliability & Intelligence Electrical Equipment, School of Electronics & Information Engineering, Hebei University of Technology, 5340 Xiping Road, Tianjin 300401, P. R. China

*Corresponding Authors: gengchong@hebut.edu.cn; shu.xu@hebut.edu.cn;

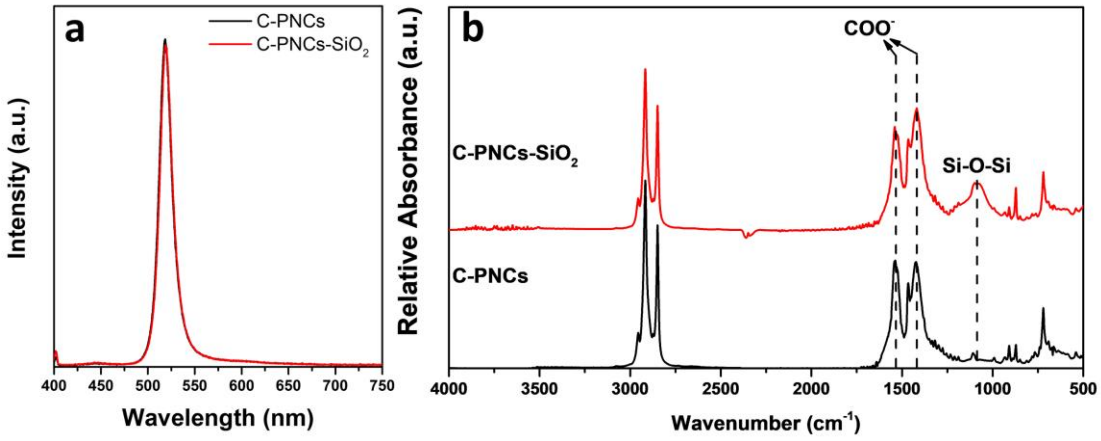

Fig. S1 PL (a) and ATR-FTIR (b) spectra of C-PNCs and C-PNCs-SiO_2, in which C-PNCs-SiO_2 was prepared by prolonging the reaction time to 8 h without adding ethanol.

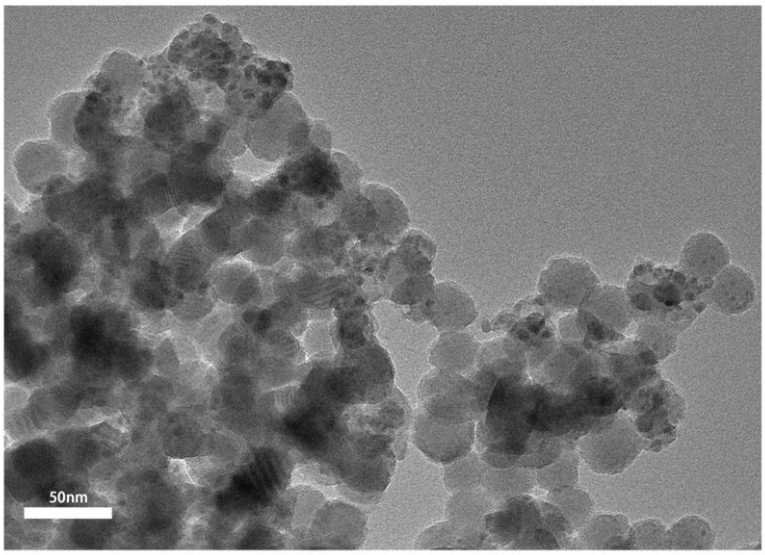

Fig. S2 TEM image of C-PNCs-SiO_2 prepared without adding ethanol.

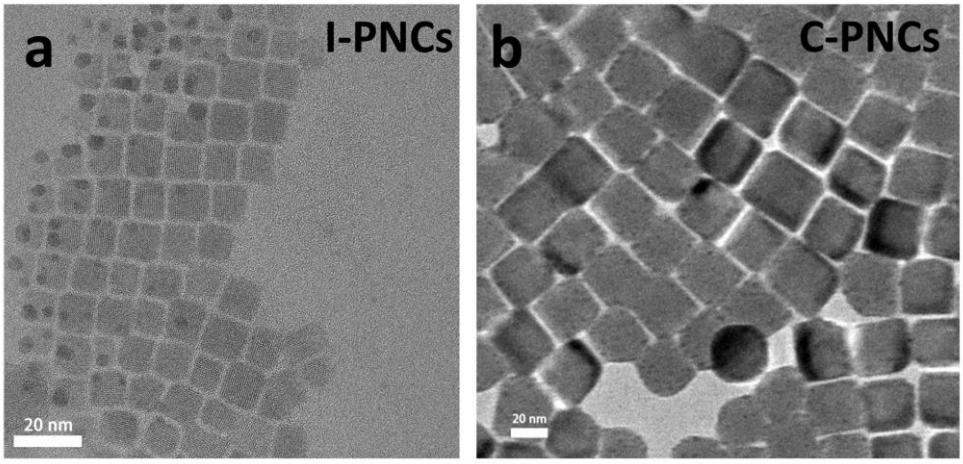

Fig. S3 TEM images of pristine I-PNCs (a) and C-PNCs (b).

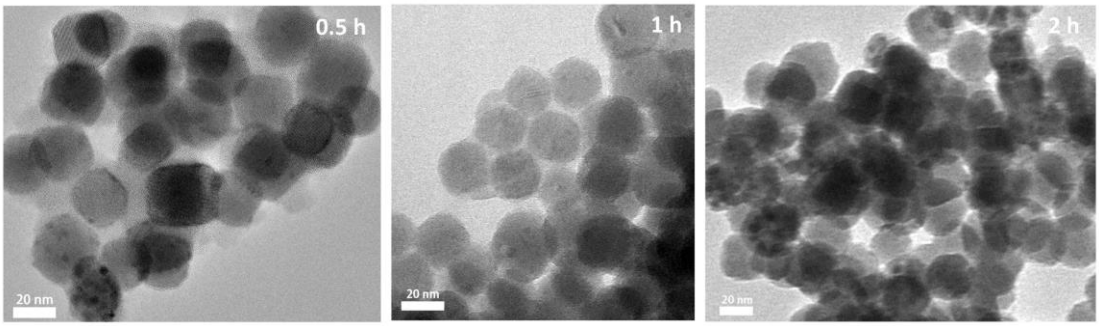

Fig. S4 TEM images of C-PNCs-SiO_2 prepared at different reaction time.

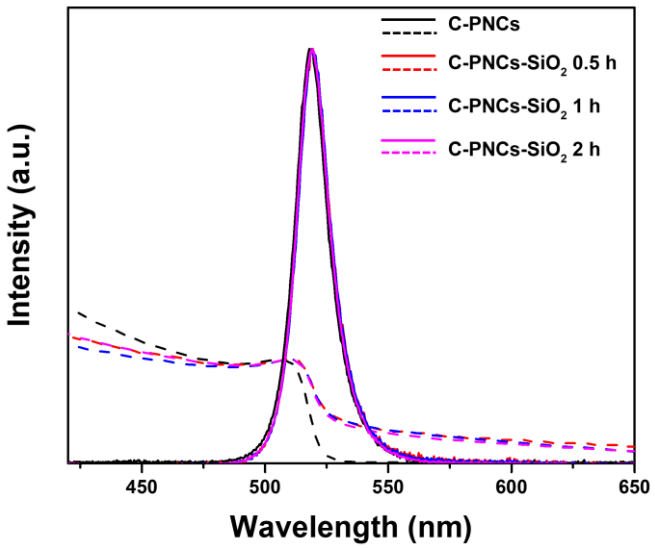

Fig. S5 UV-Vis and PL spectra of C-PNCs-SiO_2 prepared at different reaction time.

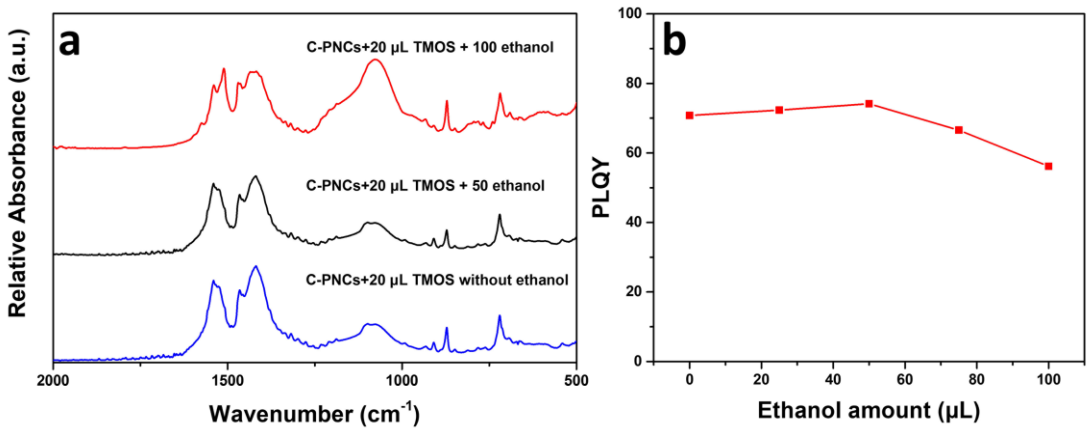

Fig. S6 (a) FTIR spectra of C-PNCs-SiO_2 synthesized with 0 μL, 50 μL and 100 μL ethanol; (b) PLQY of C-PNCs-SiO_2 synthesized with 0 μL, 25 μL, 50 μL, 75 μL and 100 μL ethanol.

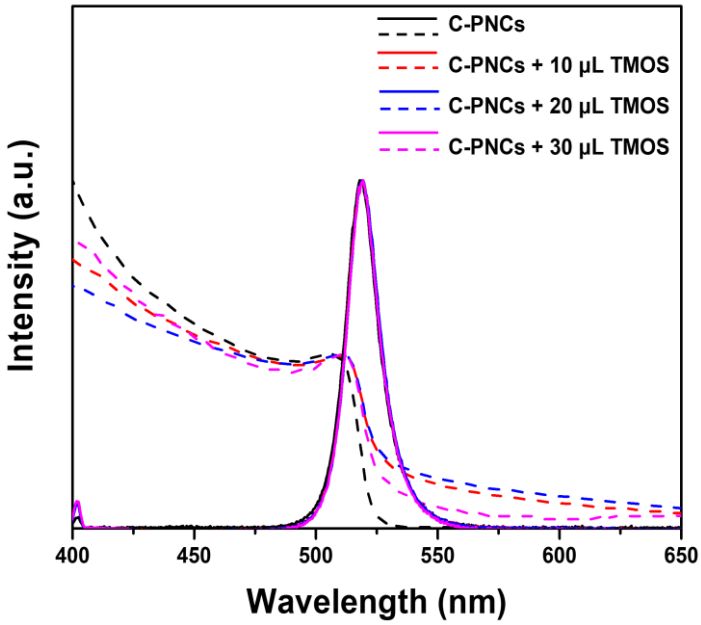

Fig. S7 The UV-Vis spectra of C-PNCs-SiO_2 prepared with different concentrations of TMOS.

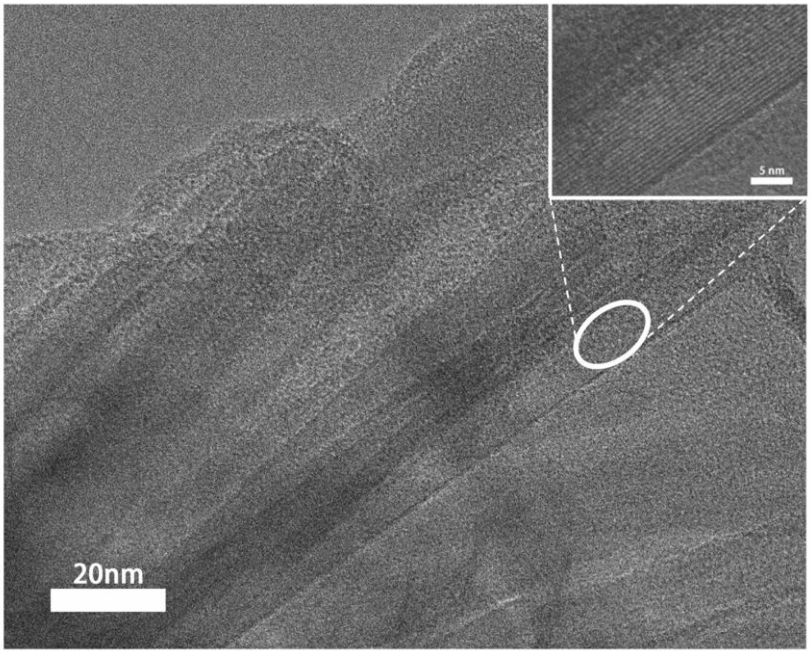

Fig. S8 TEM images of SiO_2 modified I-PNCs in the presence of ethanol.

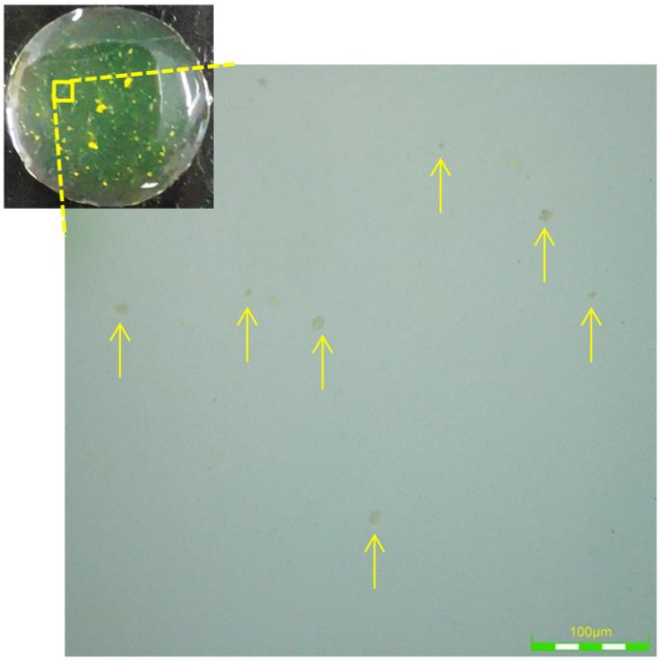

Fig. S9 Local enlarged view of silicone resin film under optical microscope and the insert shows photographs of I-PNCs-SiO_2.

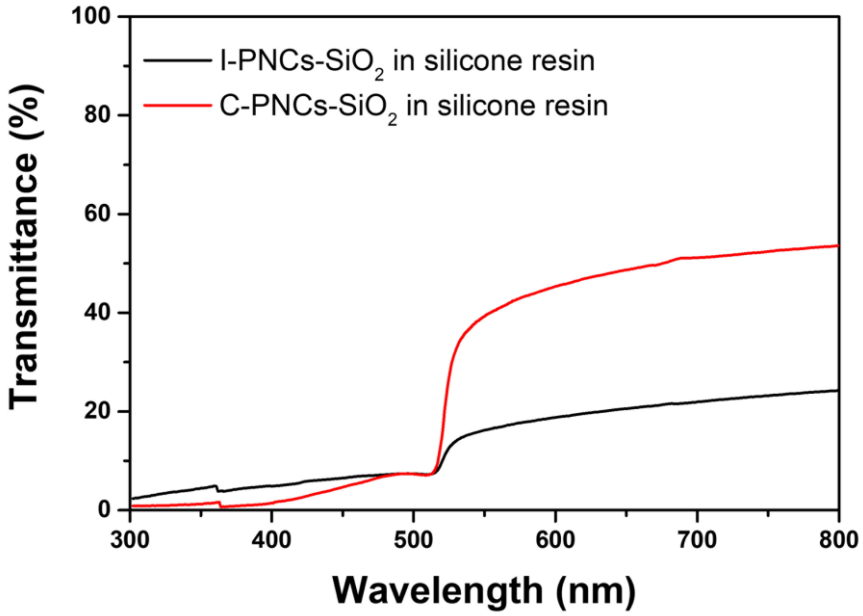

Fig. S10 Transmittance of the composite films of C-PNCs-SiO_2 and I-PNCs-SiO_2 in silicone resin.

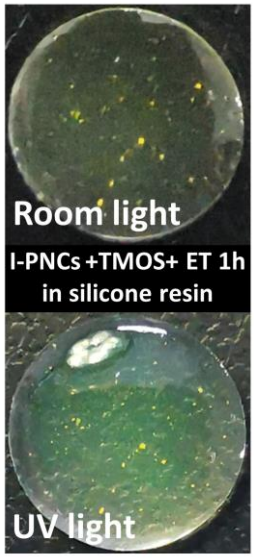

Fig. S11 Photographs of SiO_2 modified I-PNCs in silicone resin.

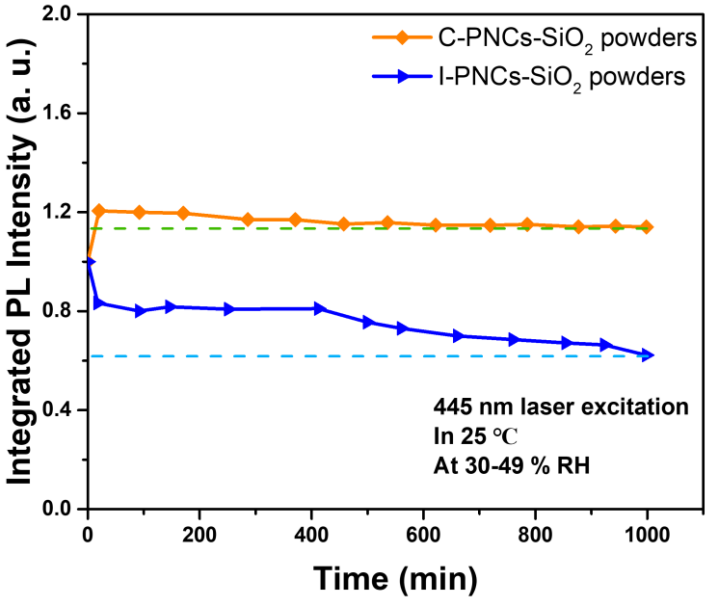

Fig. S12 Photostability of C-PNCs-SiO_2 and I-PNCs-SiO_2 powders under continuous excitation.

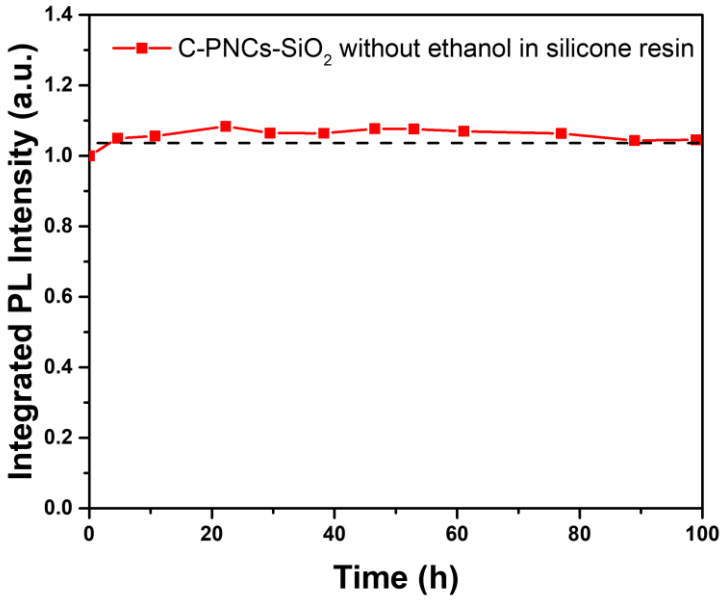

Fig. S13 Photostability of C-PNCs-SiO_2 prepared without using ethanol.

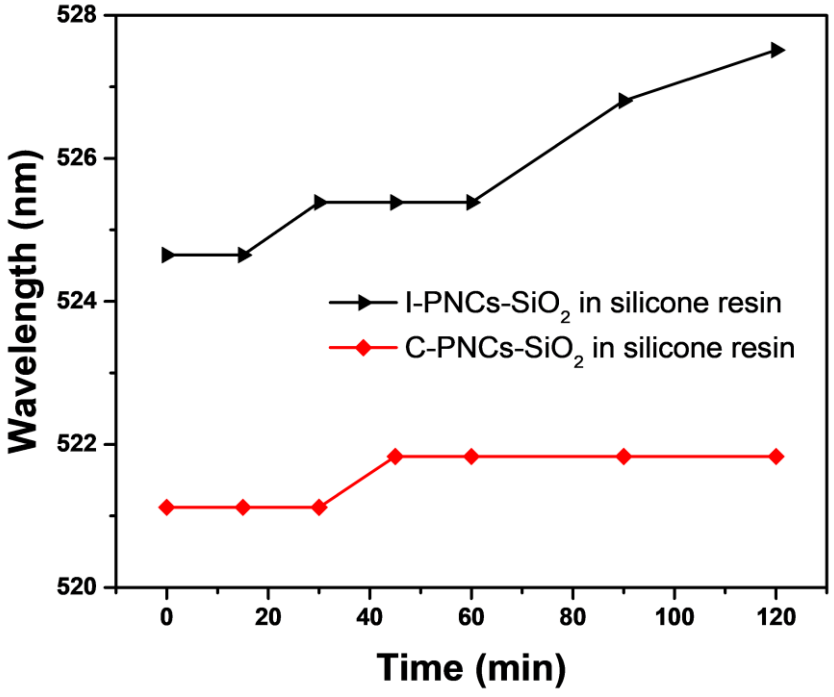

Fig. S14 PL peak shift of C-PNCs-SiO_2 and I-PNCs-SiO_2 in silicone resin during ultrasonic treatment in water.

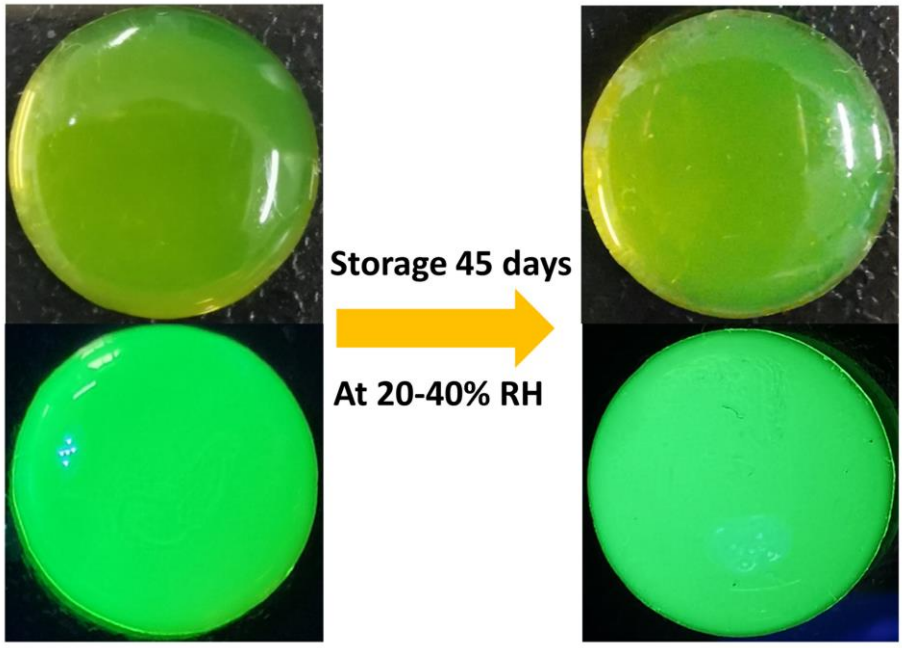

Fig. S15 Photographs of C-PNCs-SiO_2 in silicone resin stored in air at 20-40% RH for 45 days.

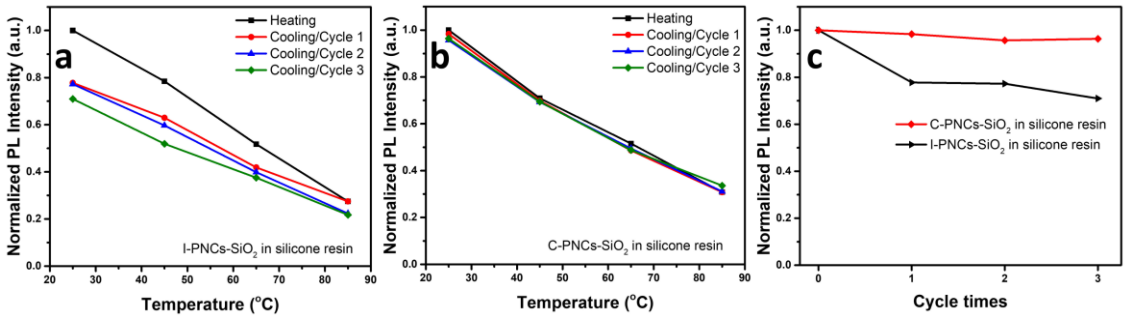

Fig. S16 Three times thermal recovery process of I-PNCs-SiO_2 (a) and C-PNCs-SiO_2 (b) at different temperatures. (c) The change of PL intensity after different cycles of thermal treatment.

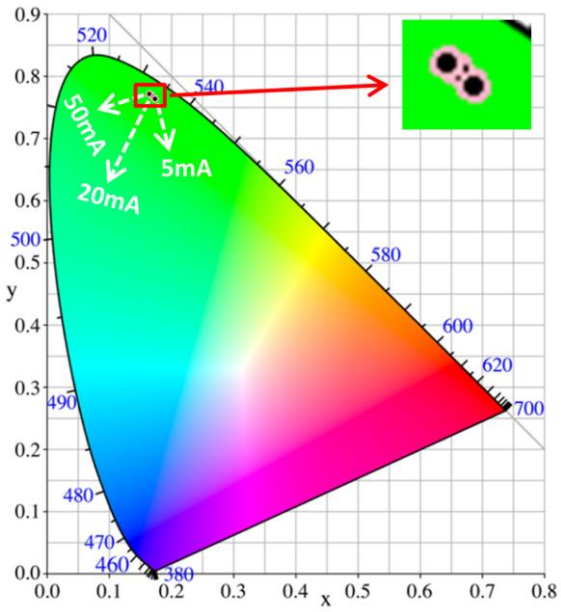

Fig. S17 Color coordinate shift of C-PNCs-SiO_2 converted LEDs under 5-50mA current.

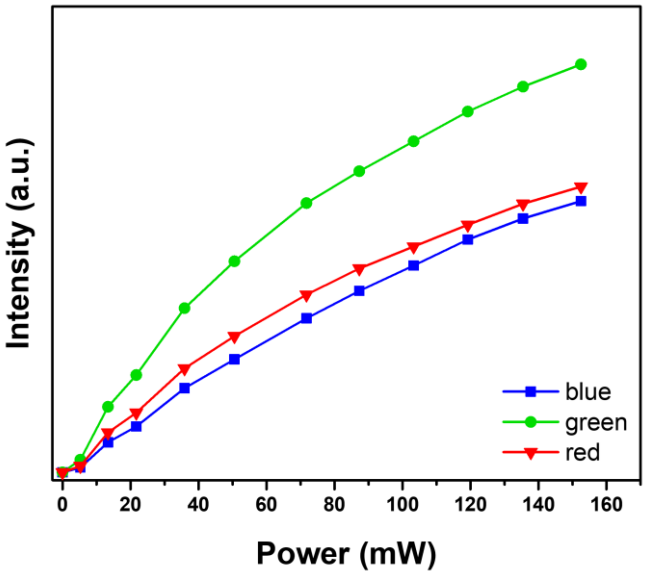

Fig. S18 The integrated intensity of red, green and blue light in LED at different operation power.