**Supporting Information:**

**Direct Laser Pruning of CdS$_x$Se$_{1-x}$ Nanobelts En Route to Multicolored Pattern with Controlled Functionalities**

Junpeng Lu$^1$, Xiaodai Lim$^2$, Minrui Zheng$^1$, Subodh G. Mhaisalkar$^3$, Chorng-Haur Sow$^1$*

$^1$Department of Physics, 2 Science Drive 3, National University of Singapore, 117542, Singapore

$^2$Graduate School of Integrative Sciences and Engineering, National University of Singapore, 28 Medical Drive, 117456, Singapore

$^3$School of Materials Science and Engineering, Nanyang Technological University, Blk N4.1, Nanyang Avenue, 639798, Singapore

*Corresponding author: physowch@nus.edu.sg

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Figure S1. (a) Optical pictures of CdS$_x$Se$_{1-x}$ nanobelts with high uniform stoichiometry. This is evident from the appearance of the samples with single color covering a large homogeneous area. From left to right, $x = 1, 0.87, 0.65, 0.29,$ and 0, respectively. (b) Low-, and (c) high-magnification SEM images of a representative CdS$_x$Se$_{1-x}$ sample.
We employed the finite element method (FEM) to compute the local temperature of the sample under focused laser beam irradiation. A 3D model of CdS$_{0.7}$Se$_{0.3}$ nanobelts film ($4 \, \text{mm} \times 4 \, \text{mm} \times 50 \, \mu\text{m}$) was built and subjected to irradiation of laser (along $-z$ direction) with 660 nm wavelength (Gaussian beam with 3 µm spot size) while the sample is moving at speed of 200 µm/s. Result shows temperature distribution when the moving laser has been irradiating for 1s. The nanobelts film has been modeled as a porous media with a volume filling factor of 0.4. Stationary air is assumed to be present in the pores. The laser heated spot reaches a temperature of 1000 K, which predicts that laser pruning would have been taking place under such settings.

![Figure S2. Temperature distribution on top surface of CdS$_{0.7}$Se$_{0.3}$ nanobelts film. (a) Perspective view. (b) XY-plane view.](image)

![Figure S3. XRD patterns of samples after thermal annealing at (a) 650 ºC, (b) 850 ºC and (c) 1050 ºC with the sample in ambient conditions.](image)
Figure S4. (a) and (b) show the typical I-V curve and on/off response under 808 nm laser illumination of annealed sample before laser pruning. The annealed sample also shows photoresponse to 808 nm light but the photocurrent is lower than that of laser modified sample. (c) and (d) show the I-V curve and on/off response of annealed sample after laser pruning under 808 nm laser illumination. Evidently, the photocurrent shows an obvious increase after additional annealing after laser pruning.

Figure S5. Reflection spectra of (a) pristine and (b) laser modified sample. The modified sample shows a larger absorption range.