Supplementary Information for

A wavelength-selective nanowire/photonic crystal waveguide

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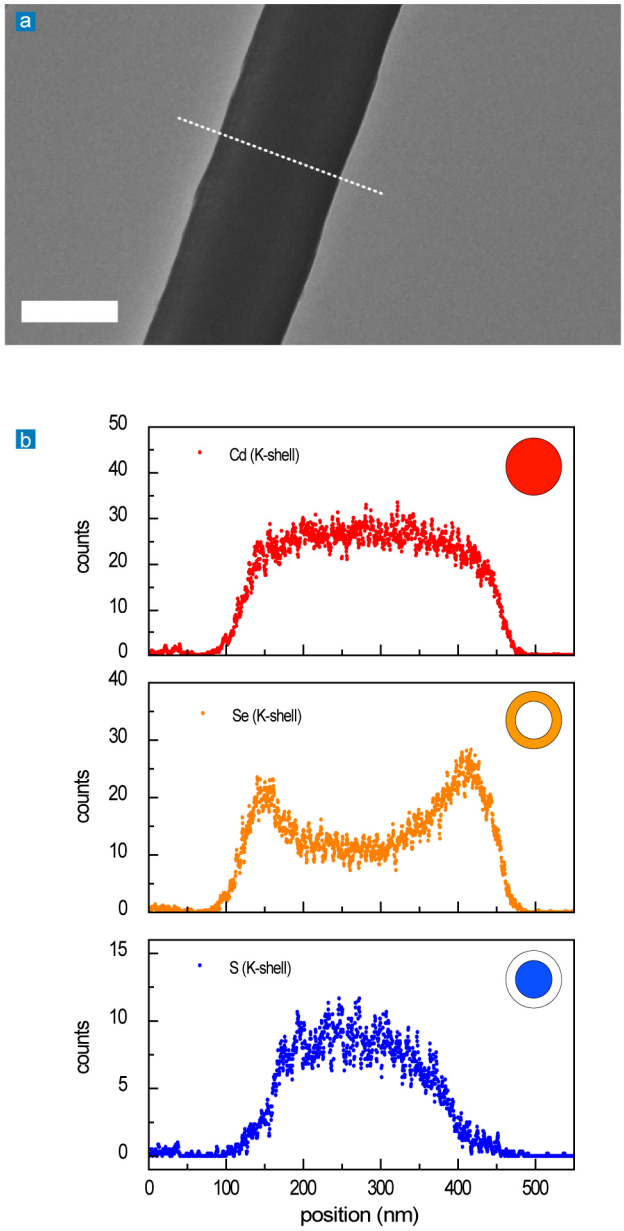

Figure S1. Transmission electron microscopy (TEM) and microanalysis of the CdS/CdSe core/shell nanowire. a, Bright-field TEM image of the CdS/CdSe core/shell nanowire. Scale bar, 200 nm. **b,** EDS line profiles for Cd (red symbols), Se (orange symbols), and S (blue symbols), respectively, recorded along the white dashed arrow indicated in Fig. S1a.

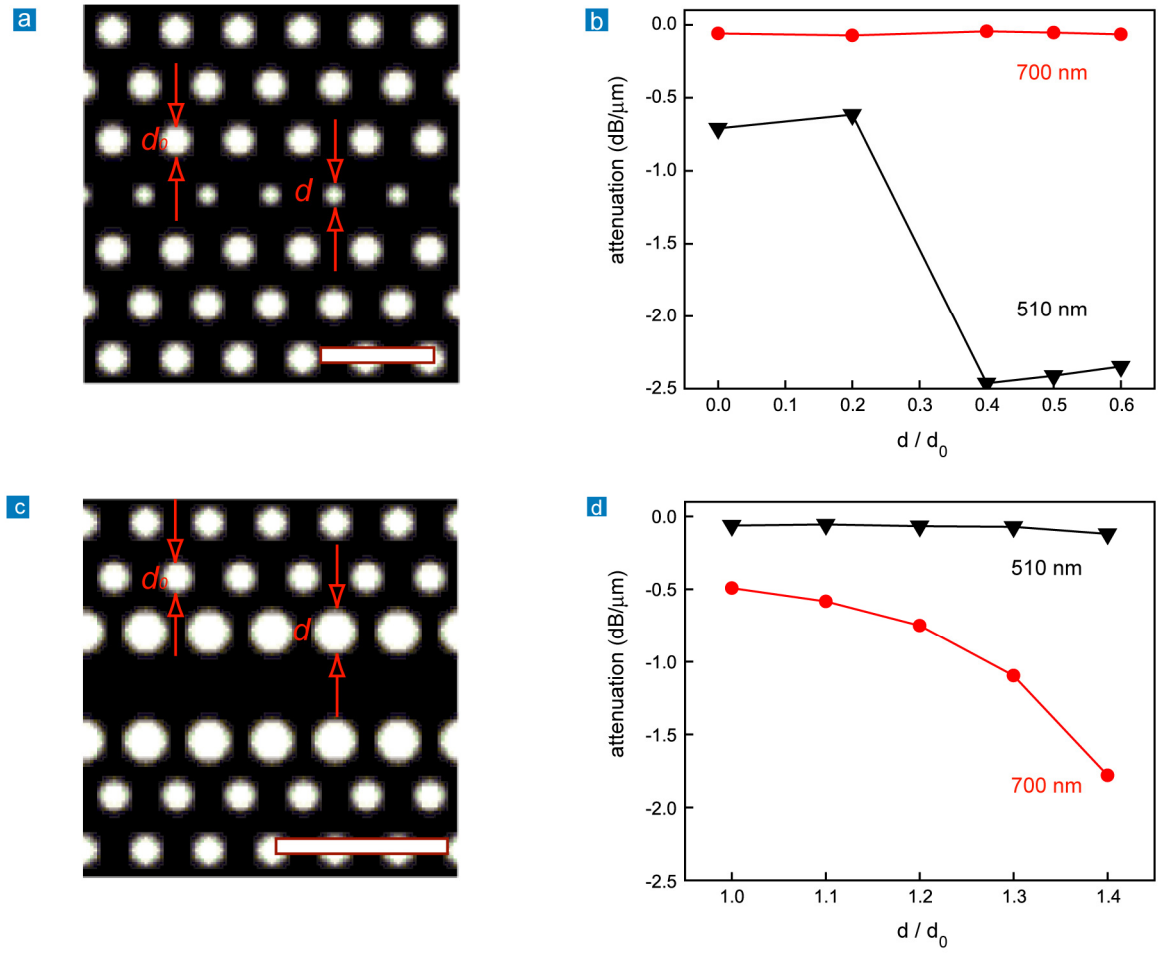

Figure S2. Systematic study of the attenuation (optical loss) as a function of structural parameters in the photonic crystal. a, Schematic of the photonic crystal waveguide for red light. The hole size is set to d_0 except for the holes size located at the center of the waveguide labelled *d*. Scale bar, 500 nm. **b,** FDTD simulation results of the attenuation of green light (510 nm) and red light (700 nm) as a function of the hole size *d*. The distance between the dipole source and output monitor is 33 lattice constants. **c,** Schematic of the photonic crystal waveguide for green light. The hole size of the photonic crystal is set to d_0 except for the holes size neighbouring the waveguide labelled *d*. Scale bar, 500 nm. **d,** FDTD simulation results of the attenuation of green light (510 nm) and red light (700 nm) as a function of the hole size *d*. The distance between the dipole source and output monitor is 33 lattice constants.

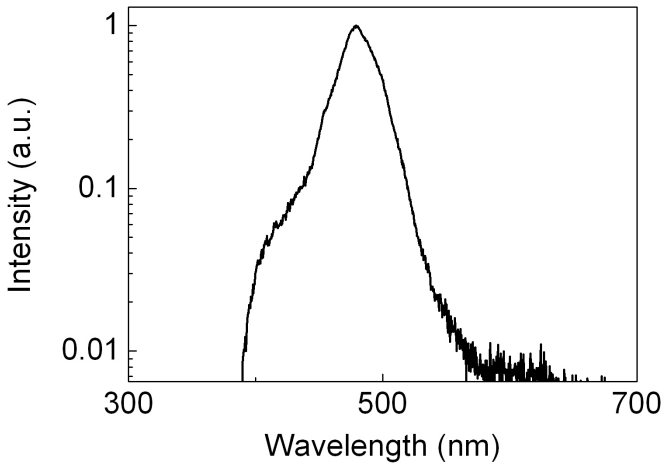

Figure S3. EL spectrum of the electrically-driven nanowire photonic crystal waveguide. EL from the nanowire is efficiently guided by the photonic crystal waveguide.

Supplementary Methods

Estimation of the experimental efficiency: The experimental efficiency that considers both the surface roughness of the waveguide and coupling between the nanowire and photonic crystal waveguide can be estimated using the PL spectra of Fig. 1e measured at the nanowire body and the end of the photonic crystal waveguide. These measured vertical emissions can be converted into in-plane propagations along the waveguide direction by using 3D FDTD simulation. The FDTD computations show that ~25.0 % of light is emitted from the nanowire on the slab along the waveguide direction compared to the vertical emission, and ~22.6 % of the power propagating along the photonic crystal waveguide is vertically scattered due to the large hole. The slit width of the spectrometer to measure the PL spectra is additionally taken into consideration: ~16 % of light emission from the nanowire is measured. The experimental efficiency – defined as the transmission normalized by the injected power along the waveguide – is estimated to be >8 % at the peak wavelength of the PL spectra (510 nm).