

Supporting Information

Vivid Structural Colors from Long-range Ordered Photonic Crystal Films with Low Angle-dependence

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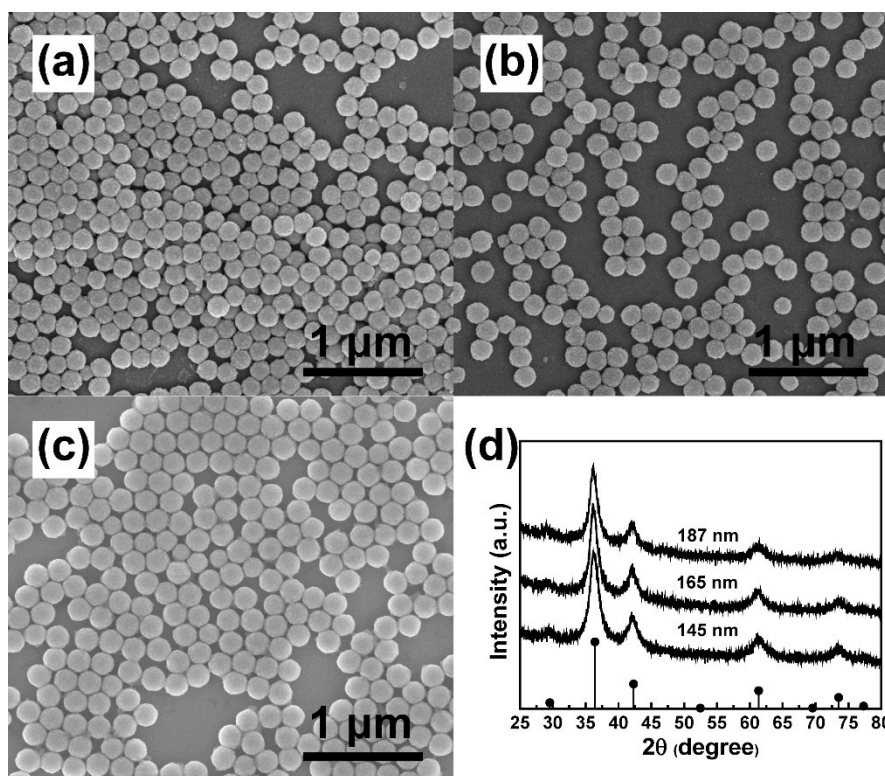


Figure S1. SEM images of monodisperse Cu₂O spheres with different diameters: (a) 145 nm; (b) 165 nm; (c) 187 nm; (d) XRD patterns of Cu₂O products of a~c

Table S1 Measured and calculated stop band peak positions of Cu₂O photonic crystals built from spheres in different diameters.

	M145 [nm]	C145 [nm]	M165 [nm]	C165 [nm]	M187 [nm]	C187 [nm]
10°	510	561	581	639	622	724
20°	506	557	580	634	617	718
30°	502	550	573	626	608	710
45°	496	537	566	611	599	693
60°	488	524	556	596	590	676

M145 nm, M165 nm and M187 nm stand for measured results of Cu₂O photonic crystals built from spheres in these three diameters. C145 nm, C165 nm and C187 nm stand for corresponding calculated results.

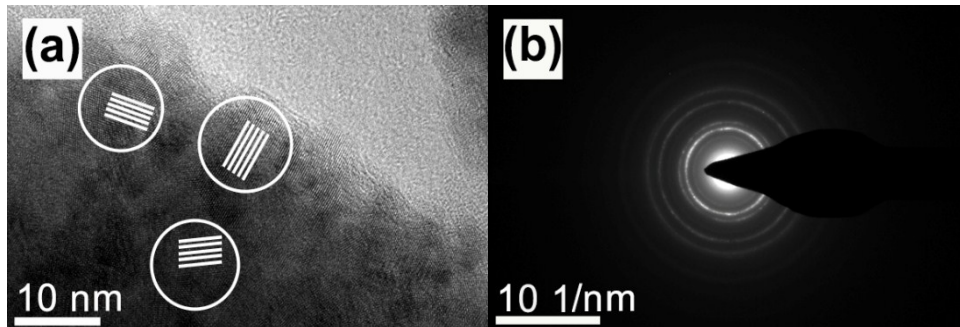


Figure S2 (a) TEM image of a typical Cu₂O sphere showing the randomly oriented nanocrystals inside; (b) Selected-area electron diffraction image of a Cu₂O sphere

Table S2 Calculated and measured peak positions of PS photonic crystal (built from 240 nm PS spheres)

Incident angle	Calculated (nm)	Measured (nm)
10°	568	574
20°	556	562
30°	538	544
45°	500	510

Table S3 Calculated and measured peak positions of SiO₂ photonic crystal (built from 270 nm SiO₂ spheres)

Incident angle	Calculated (nm)	Measured (nm)
10°	592	604
20°	578	588
30°	555	562
45°	509	513

Table S4 Calculated and measured peak positions of PS photonic crystal (built from 193 nm PS spheres)

Incident angle	Calculated (nm)	Measured (nm)
10°	457	462
20°	447	452
30°	432	438
45°	402	413

Table S5 Calculated and measured peak positions of SiO₂ photonic crystal (built from 185 nm SiO₂ spheres)

Incident angle	Calculated (nm)	Measured (nm)
10°	406	400
20°	396	390
30°	380	375
45°	349	344

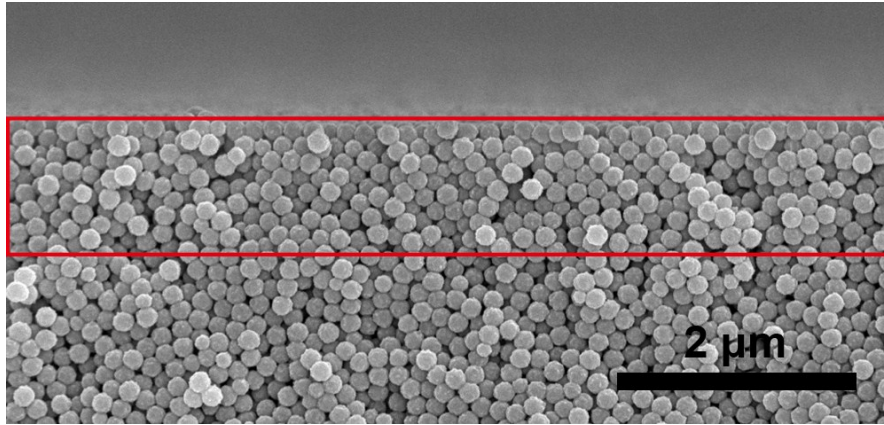


Figure S3 SEM image of cross-section in the Cu₂O opal film obtained from 165 nm spheres

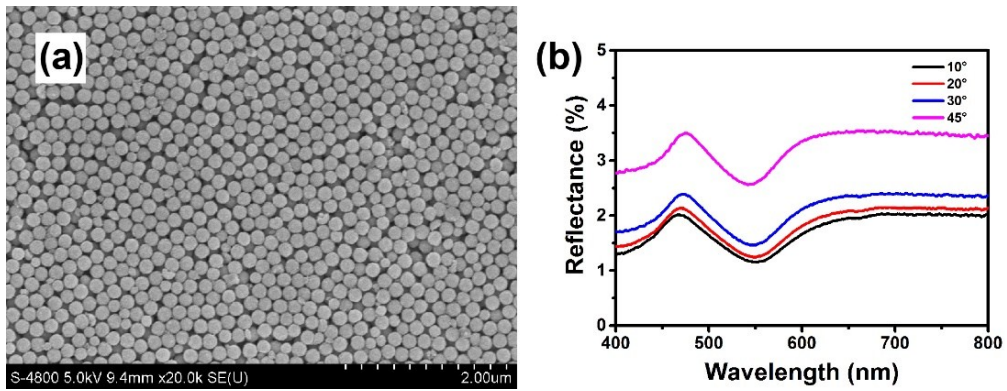


Figure S4 (a) SEM image and (b) reflection spectrum of Cu₂O film with disordered arrays

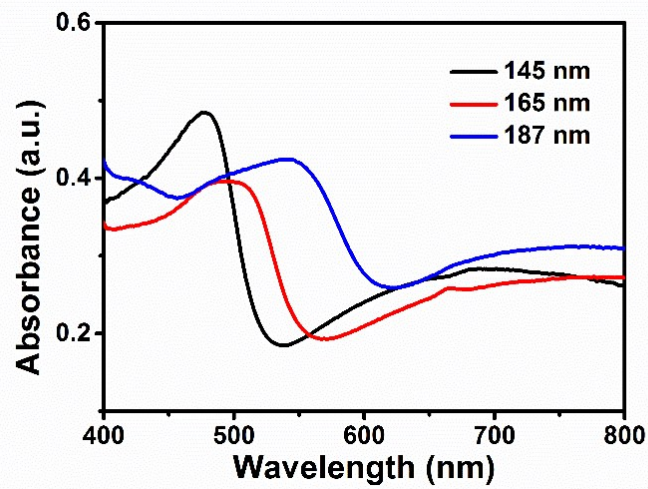


Figure S5 Absorption spectra of Cu_2O photonic crystal films with spheres in different diameters

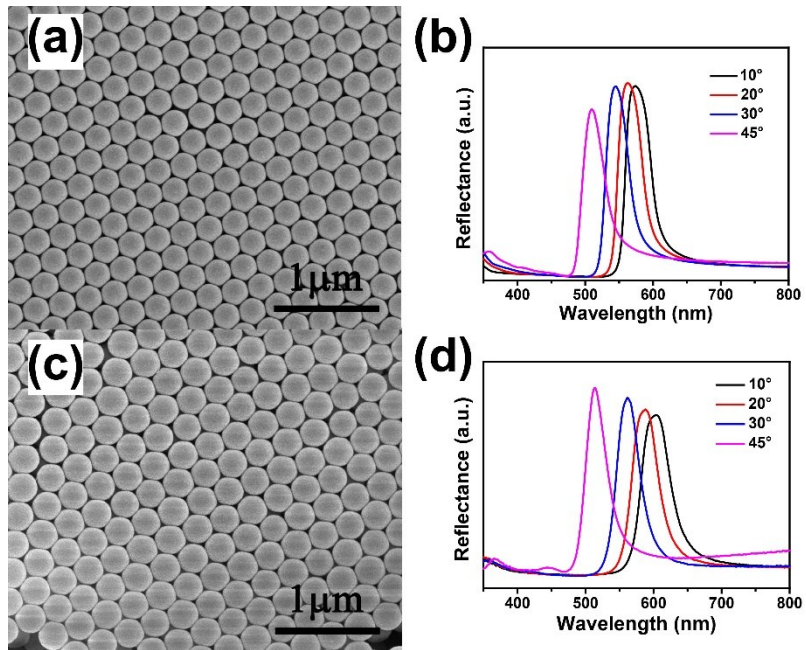


Figure S6 (a) SEM image of the photonic crystal film built from 240 nm PS spheres; (b) UV-vis reflection spectrum taken from the PS photonic crystal film; (c) SEM image of the photonic crystal film built from 270 nm SiO_2 spheres; (d) UV-vis reflection spectrum taken from the SiO_2 photonic crystal film

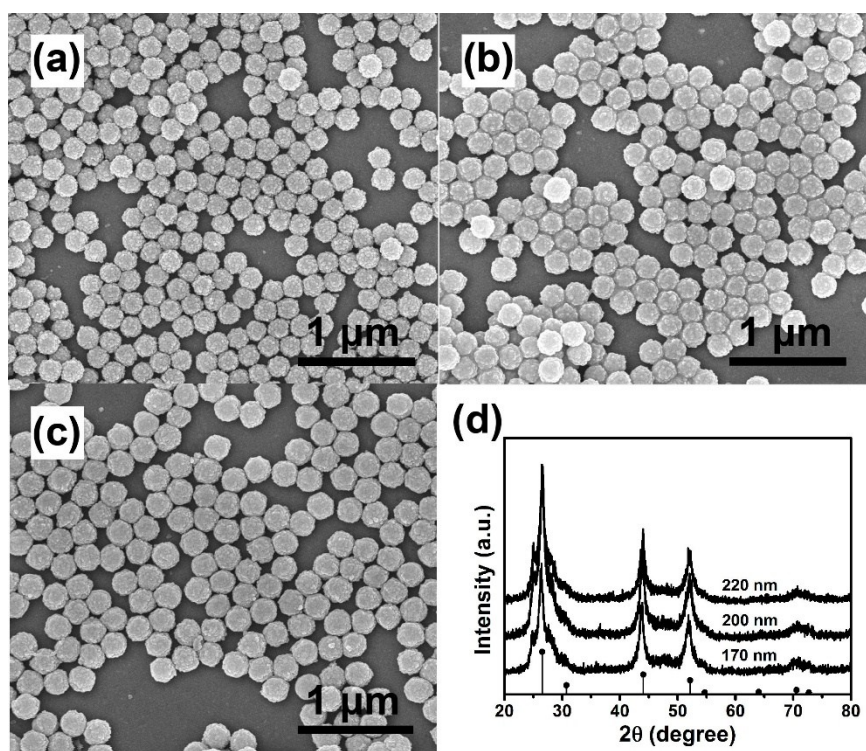


Figure S7. SEM images of monodisperse CdS spheres with different diameters: (a) 170 nm; (b) 200 nm; (c) 220 nm; (d) XRD patterns of CdS products of a~c

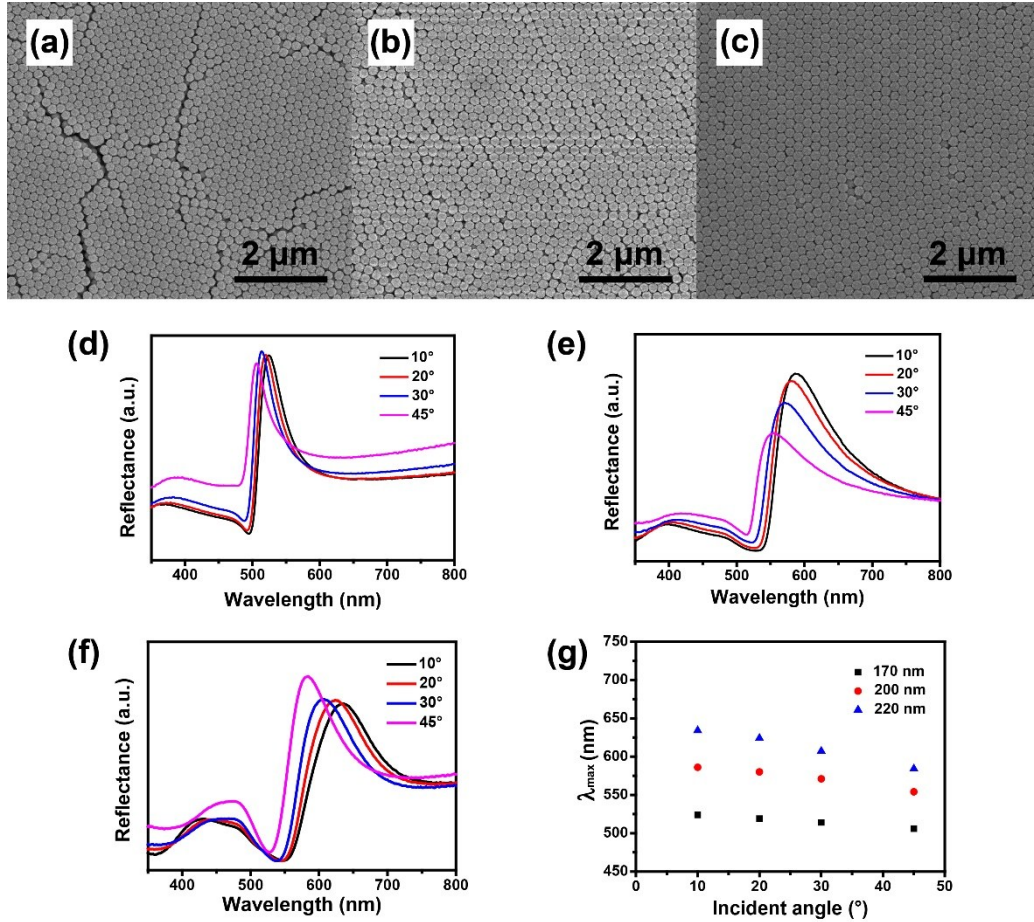


Figure S8 SEM images of CdS photonic crystal films fabricated with CdS spheres in different diameters. (a)170 nm; (b)200 nm; (c)220 nm. (d~f) are the reflection spectra of CdS photonic crystal films built from 170 nm, 200 nm and 220 nm spheres; (g) Plots showing λ_{\max} of the reflection spectra for different CdS photonic crystal films versus the incident angles

Table S6 Measured and calculated stop band peak positions of CdS photonic crystal films built from spheres in different diameters.

	M170	C170	M200	C200	M220	C220
	[nm]	[nm]	[nm]	[nm]	[nm]	[nm]
10°	524	612	586	720	634	792
20°	519	606	580	713	624	784
30°	514	598	571	703	607	773
45°	506	581	554	684	584	752

M170, M200 and M220 stand for measured results of CdS photonic crystal films built from spheres in these three diameters; C170, C200 and C220 stand for the corresponding calculated results.