Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Environment-Dependent Optical Scattering of Cuprous Oxide Microcrystals in Liquid Dispersions and Langmuir-Blodgett Films

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Supporting Information

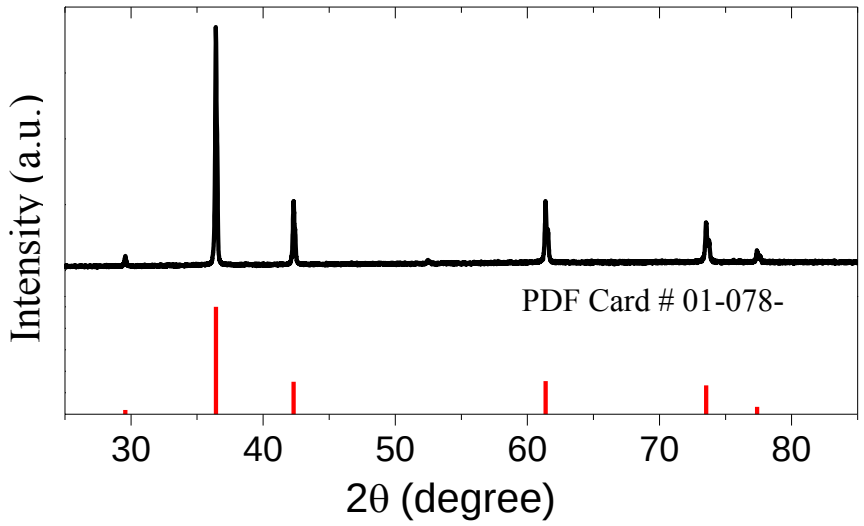

Figure S1. Powder X-ray diffraction pattern for the Cu_2O sample. The positions of XRD peaks match the Cu_2O peaks from the standard PDF card.

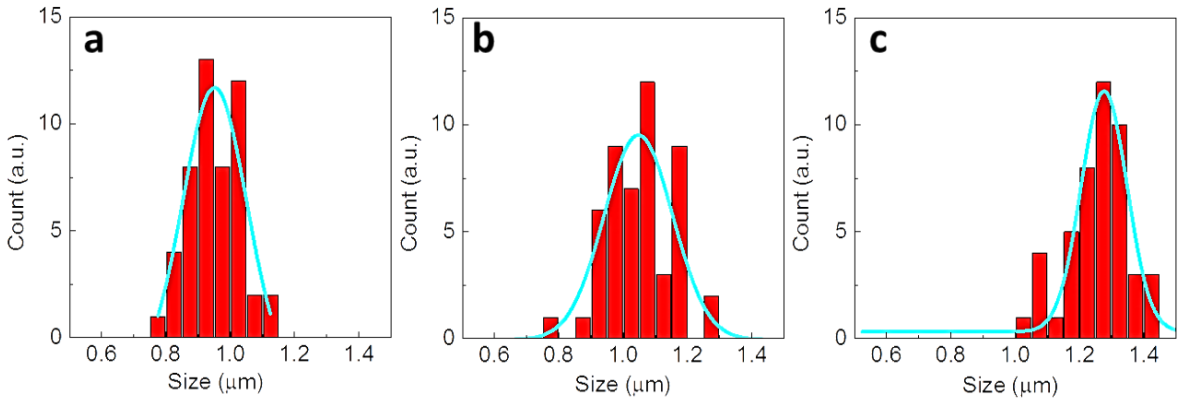

Figure S2. Size distributions of as synthesized Cu_2O microcrystals with precursors' formation under different temperature (a-c, 16°C, 10°C, and 5°C). The lengths of their edge are 950±164, 1050±128, and 1280±168 nm, respectively. The approximated diameters in stimulation for those microcrystals are 1300, 1400, and 1700 nm, respectively.

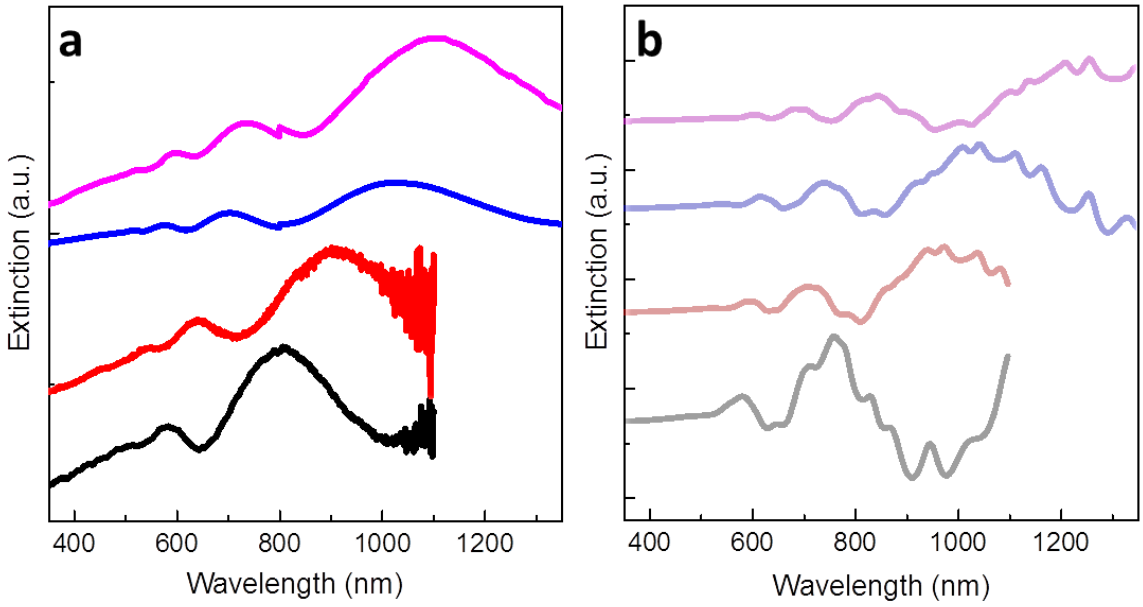

Figure S3. Experimental (a) and calculated (b) extinction spectra of Cu_2O microcrystals with precursors at different temperature suspended in methanol.

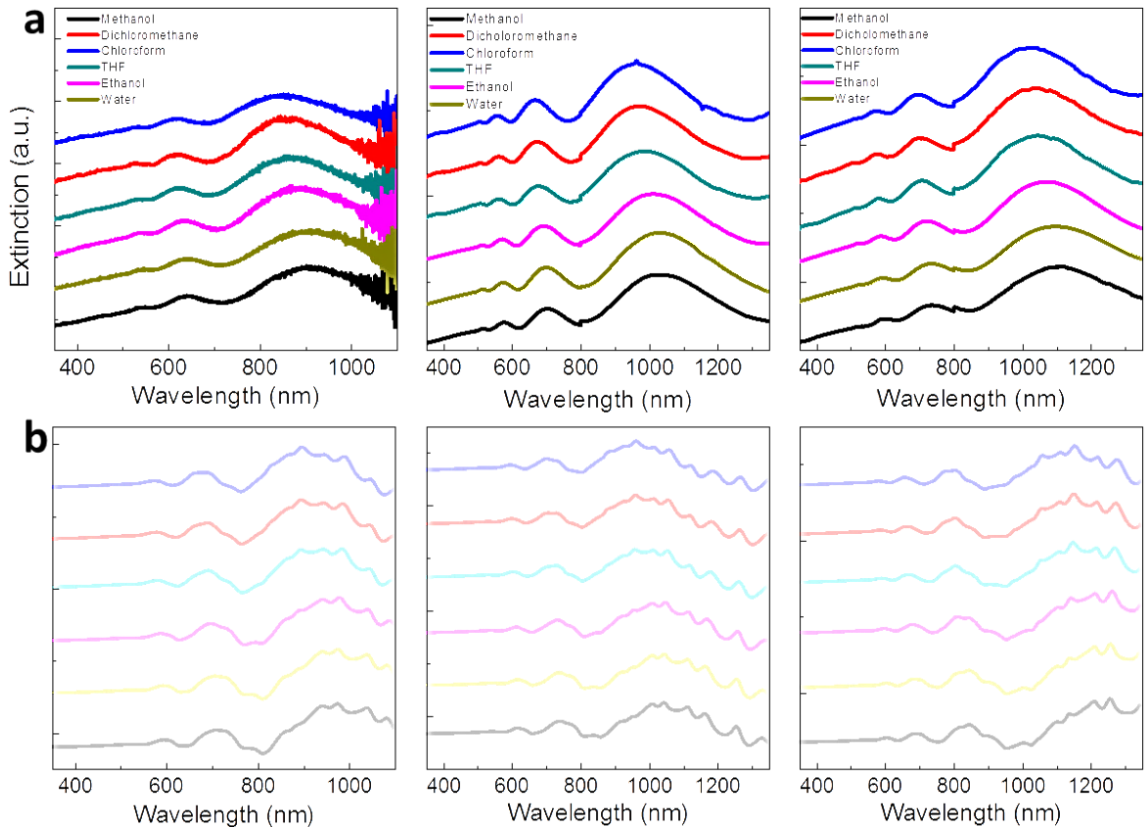

Figure S4. Extinction spectra of Cu_2O microcrystals with different morphologies suspended in different mediums, (a) from experimental, and (b) by calculation.

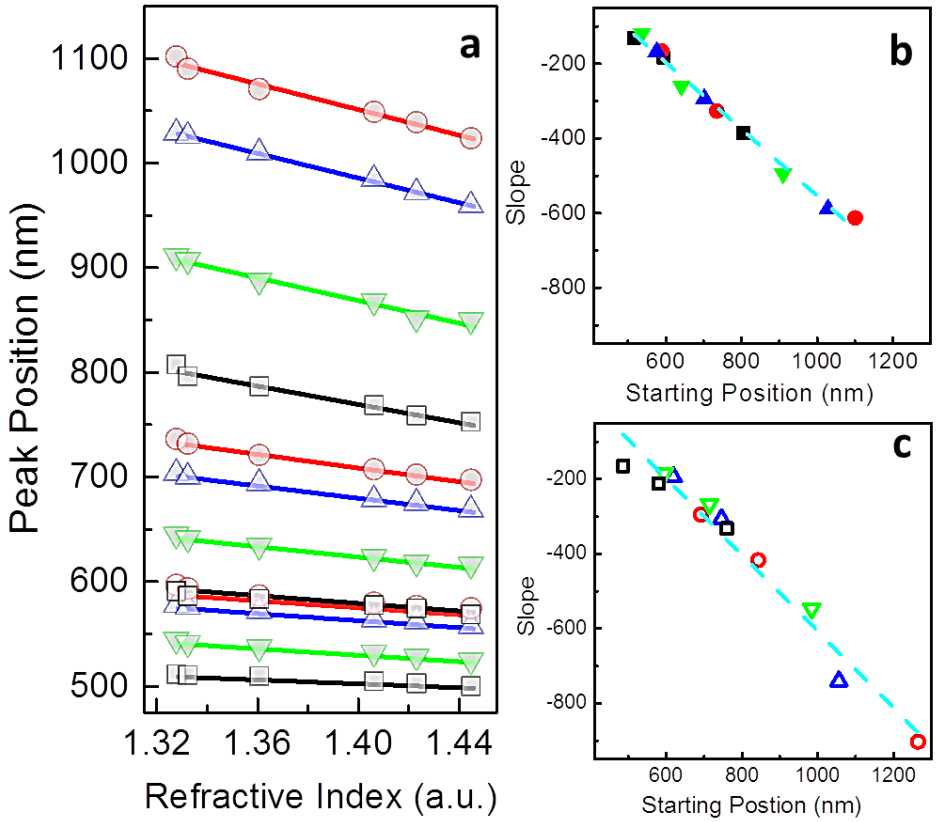

Figure S5. (a) Sets of extinction peak positions variation in different solvents. Same color code for one type of Cu_2O microcrystal. (b) Starting positions of all feature peaks of Cu_2O microcrystals (suspended in methanol) versus slopes. (c) Calculated relationship between starting peak positions versus slopes.

Table S1: Characteristic extinction peak position/energy of Cu_2O microcrystals into variety of environments on casting and LB films.

Solvent	Casting film nm/eV							LB film nm/eV					
	Peak I		Peak II		Peak III			Peak I		Peak II		Peak III	
Methanol	510	2.431	582	2.131	784	1.581		505	2.455	576	2.153	768	1.614
Water	508	2.441	580	2.138	782	1.586		504	2.461	575	2.157	766	1.619
Ethanol	506	2.451	575	2.156	771	1.608		502	2.471	570	2.175	753	1.647
THF	503	2.465	568	2.183	755	1.624		500	2.481	563	2.202	740	1.676
Dichloromethane	501	2.475	565	2.195	750	1.653		497	2.495	558	2.222	732	1.694
Chloroform	498	2.490	560	2.214	740	1.676		495	2.505	555	2.234	724	1.713

Table S2: Characteristic extinction peak position/energy of Cu_2O microcrystals with different morphologies in variety of environments.

Size 900 nm, peak position/ energy (nm/eV)

Solvent	Peak I		Peak II		Peak III	
Methanol	509	2.436	588	2.109	806	1.538
Water	508	2.441	584	2.123	794	1.562
Ethanol	507	2.446	581	2.134	785	1.581
THF	502	2.470	575	2.156	767	1.617
Dichloromethane	500	2.480	572	2.168	757	1.638
Chloroform	497	2.495	566	2.191	751	1.651

Size 1300 nm, peak position/ energy (nm/eV)

Solvent	Peak I		Peak II		Peak III	
Methanol	542	2.287	624	1.929	909	1.363
Water	538	2.302	639	1.939	905	1.369
Ethanol	534	2.318	632	1.962	886	1.341
THF	529	2.341	621	1.996	866	1.431
Dichloromethane	526	2.358	616	2.013	850	1.456
Chloroform	522	2.374	614	2.021	848	1.462

Size 1400 nm, peak position/ energy (nm/eV)

Solvent	Peak I		Peak II		Peak III	
Methanol	575	2.155	701	1.767	1027	1.206
Water	573	2.162	698	1.776	1024	1.211
Ethanol	569	2.178	692	1.792	1008	1.229
THF	561	2.209	676	1.883	983	1.261
Dichloromethane	559	2.217	673	1.842	970	1.277
Chloroform	555	2.234	666	1.861	958	1.294

Size 1700 nm, peak position/ energy (nm/eV)

Solvent	Peak I		Peak II		Peak III	
Methanol	594	2.085	734	1.688	1101	1.126
Water	591	2.097	730	1.699	1089	1.138
Ethanol	584	2.121	719	1.724	1070	1.159
THF	577	2.147	705	1.758	1048	1.183
Dichloromethane	574	2.161	700	1.771	1038	1.195
Chloroform	572	2.166	695	1.783	1022	1.212