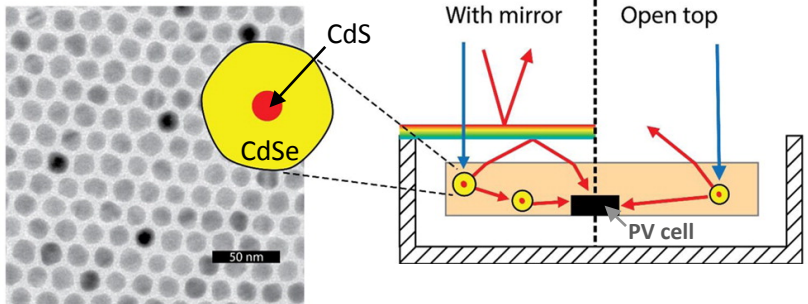
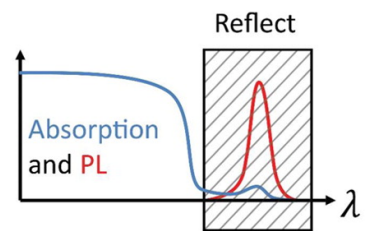


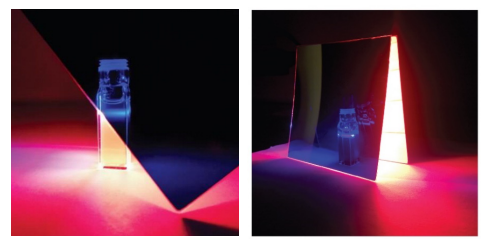
# Luminescent Concentration of Diffuse Light Achieving 30X Concentration



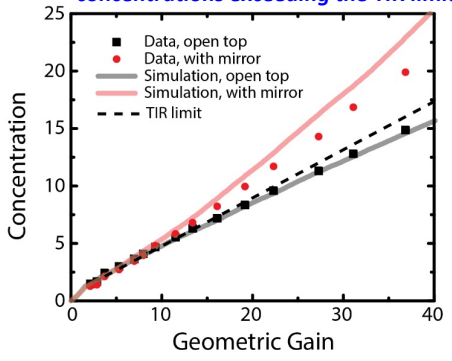
Desired Absorption and PL Spectra for the LSC cavity



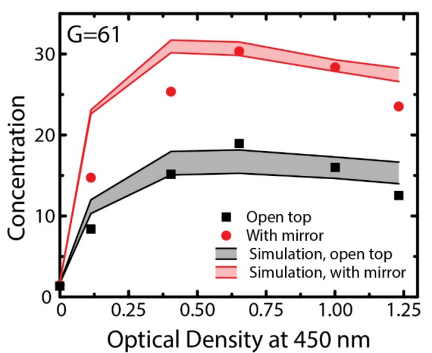
The red quantum dot emission is trapped by the photonic mirror



Addition of photonic mirror enables concentrations exceeding the TIR limit



Concentration Factor 30.3 achieved Record value to date



## Scientific Achievement

Highest luminescent solar concentration ratio to date achieved using tailor-made quantum dots and specially tuned photonic mirrors. Luminesced photons propagate through the entire device unimpeded.

## Significance and Impact

High concentration in luminescent concentrators is necessary to recover Stokes shift as voltage. Our design yields best-known way to achieve high luminescent concentration while maintaining high collection efficiency.

## Research Details

- CdSe/CdS core/shell quantum dots optimized to minimize extinction of luminescence
- Custom dielectric mirror fabricated, reflects luminescence with 98% angle- and wavelength-averaged reflectivity
- Quantum dots integrated into polymer waveguide with embedded silicon PV cell; waveguide then placed inside white trough with photonic top-mirror, and illuminated by solar simulator

Work was performed at LBL and UIUC

Bronstein, N.D.; Yao, Y.; Xu, L.; O'Brien, E.; Powers, A.S.; Ferry, V.E.; Alivisatos, A.P.; Nuzzo, R.G. *ACS Photonics*, 2015. DOI: 10.1021/acsphotonics.5b00334