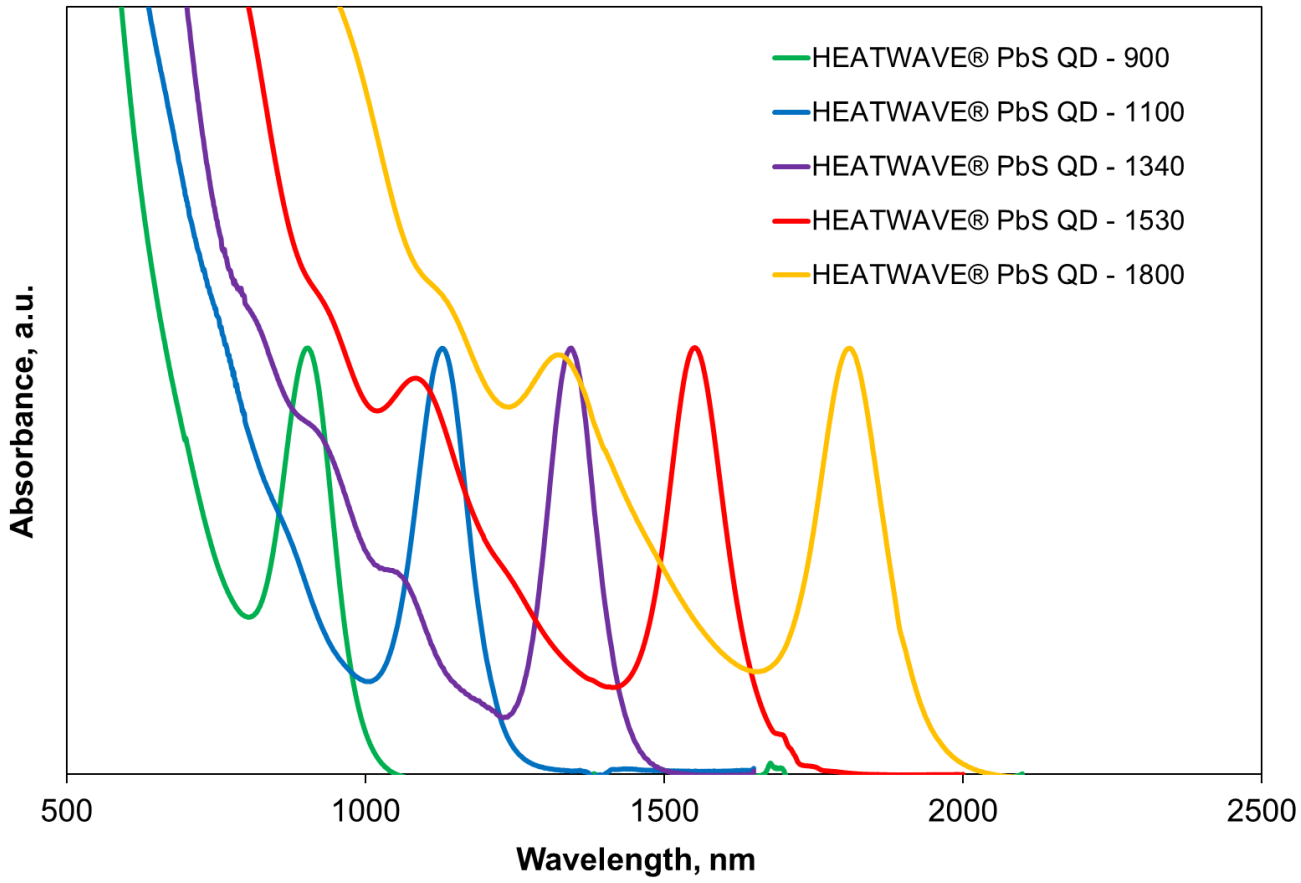
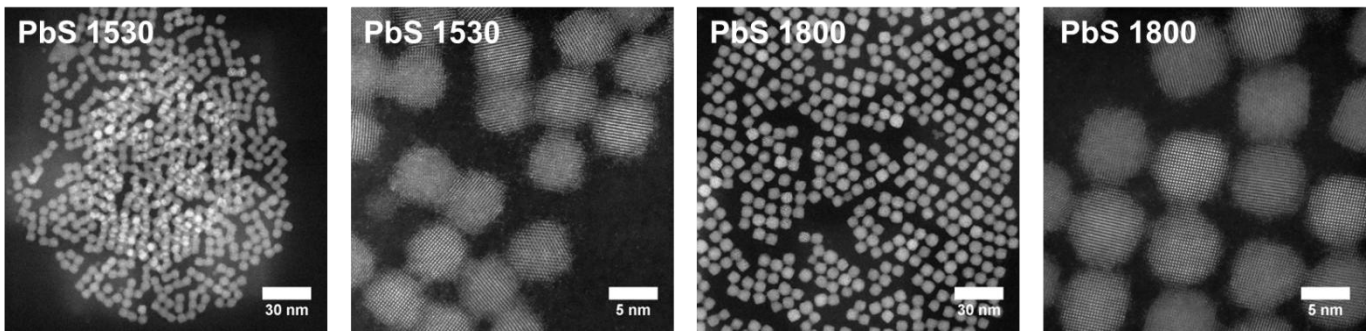
Technical Data Sheet – HEATWAVE® PbS QDs

HEATWAVE® lead sulphide (PbS) quantum dots (QDs) are semiconductor nanocrystals with absorption across the visible and IR. Their size dependent optical properties mean that by controlling the size of the particles, we can tune the absorption peak across the shortwave infrared (SWIR) region of the electromagnetic spectrum. Our proprietary synthesis enables fabrication of QDs with first absorption peaks ranging from 800 – 2000 nm. As indicated by the distinct excitonic features in the absorption spectra, the low full width at half maximum (FWHMs), as well as the TEM images below, our synthesis yields highly uniform ensembles of nanocrystals that are ideal for QD SWIR sensing applications.

Absorption Spectra of HEATWAVE® PbS QDs



Transmission Electron Microscopy Images of HEATWAVE® PbS QDs



HEATWAVE® PbS QD Properties

Material	Absorption Peak (nm)	Size (nm)	FWHM of absorption (nm)	Peak to valley ratio*	Organics (wt%)
PbS	900	~3.5	≤130	>2	<45
PbS	1100	~4	≤110	>4	<35
PbS	1340	~5.5	≤120	>5	<35
PbS	1530	~6.5	≤120	>5	<35
PbS	1800	~8	≤180	>3	<25

**Peak to valley ratio is provided here as the ratio of first absorption peak to deepest valley in spectrum.*

Quality Control

Samples are provided as powders or solutions in high purity octane with a standard concentration of 50 mg/mL. A certificate of analysis (CoA) is provided with all samples, outlining the material's specifications and test results – see standard CoA below. Please enquire for alternative solvents, concentrations and additional testing capabilities.

TEST	TYPICAL VALUES	UNITS
Appearance	Dark brown/black solution, with no visible particles	N/A
Exciton peak position	1530 ± 25	nm
FWHM	≤ 120	nm
P:V ratio	≥ 5	N/A
Organics	20 - 35	wt%
Concentration	50 ± 10	mg/mL

Materials Handling

Materials are to be stored at 2-8°C, protected from light, under inert gas. We recommend materials processing in an inert atmosphere. Stability under these conditions is maintained for up to 6 months.

Nanoco's HEATWAVE® PbS QDs are electronic grade materials, enabling high performance SWIR sensing at key commercial wavelengths