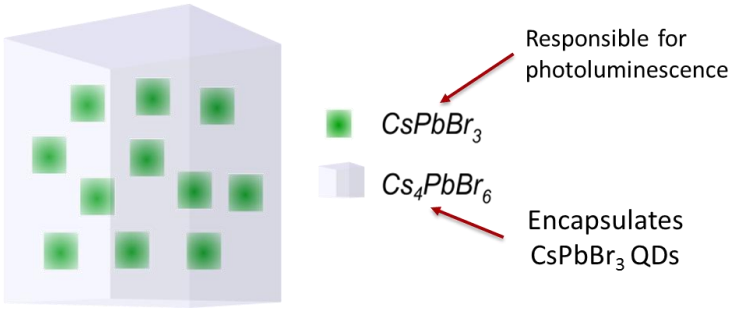
Zero-Dimensional Cs_4PbBr_6 Perovskite

Technical Data Sheet

Zero-D powder	Zero-Dimensional Perovskite, powder, 515 nm peak emission

Cs_4PbBr_6 Zero-Dimensional Perovskite represents a composite material that consists of $CsPbBr_3$ QDs that are embedded into transparent C_4PbBr_6 matrix.

Zero-D perovskite Cs_4PbBr_6 structure:



The emission profile is similar to $CsPbBr_3$ QDs (emission peak 515 nm, FWHM<25 nm, PLQY up to 70-80 %), but because this materials is encapsulated with Cs_4PbBr_6 phase, it shows exceptional stability. This makes him very promising for light conversion technologies as a remote phosphors for lighting applications or others. This material is in the powder form with micron size particles. Zero-D material is chemically more robust and can withstand the temperature up to 180 ^oC in air for several hours. Because of the encapsulation matrix, 4-5 times more concentration of the material is required than genuine $CsPbBr_3$ QDs to achieve the same light intensity.

QUANTUM SOLUTIONS is the pioneer in the synthesis of the pure form of this material. Quality control is provided by the modern equipment: UV-vis-IR spectrometer, a fluorescence spectrometer with broadband and integrating sphere capability, Transmission electron spectroscopy and Diffractometer.

Application fields

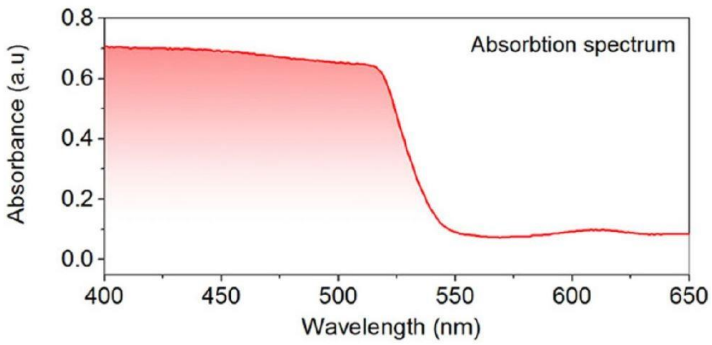
Cs_4PbBr_6 narrow emission peaks, high PLQY in powders form and exceptional stability make this material very promising for light-to-light conversion technologies. This material can be used as a remote phosphors for lighting applications etc.

Features

- High efficient and stable luminescence powder materials for optoelectronic applications. Low lead content.
- Bright luminescent color, narrow fluorescence band (FWHM < 25 nm) and high photoluminescence quantum yield (PLQY is up to 70-80 %) in powder form.

Specification

Catalog Number	Zero-D powder
Type	Cs_4PbBr_6
Appearance	Yellow-green powder
Emission peak	515 ± 5 nm
FWHM	≤ 25 nm
PLQY	> 45 %
Particle size	0.5 - 6µm (average: 2 µm)
Dispersibility	Toluene - good Heptane – good Octane – good Acetone – no DMSO – poor, degrade Alcohols - degrade Water - degrade



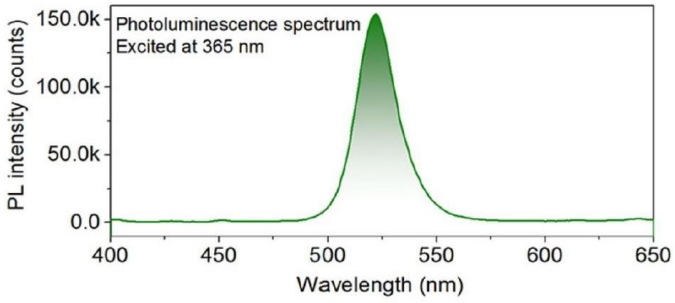


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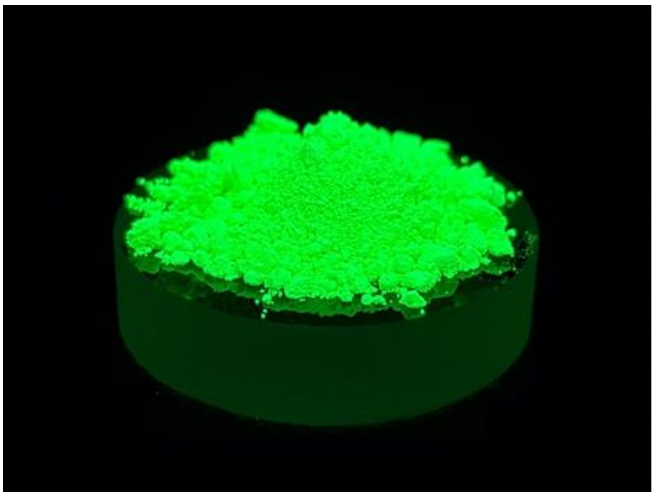
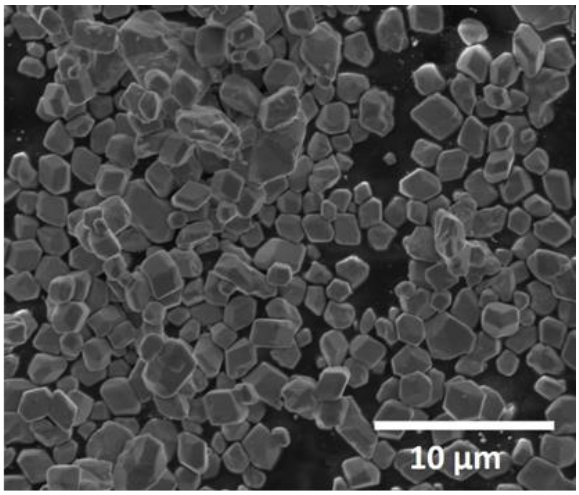
Photo of Zero-D Perovskite under UV light

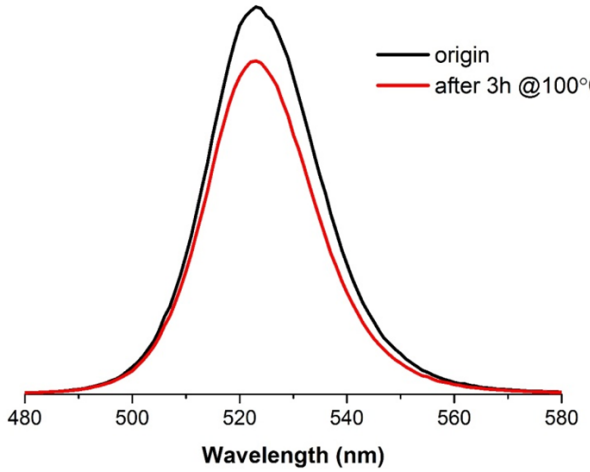


SEM image of Zero-D Perovskite powder

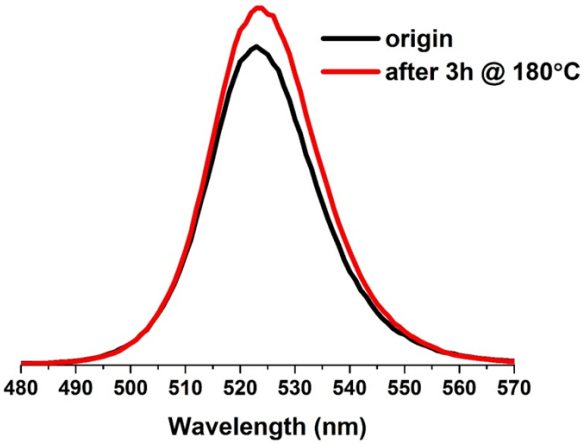


Luminescence temperature stability in air/N_2

In air, 100 °C



In N_2, 180 °C



Notes for handling

- Shelf Life 1 year. Store temperature 2-25 °C. Store in DARK, in sealed packaging or in a glovebox under N_2.
- This material is stable in air
- Material is dispersible in nonpolar solvents: toluene, hexane, octane, benzene and others
- Material is tested to be compatible with following polymers: PMMA, PP, PS, PDMS, UV curable resins. For more information please contact info@quantum-solutions.com
- Material degrades in polar solvents: water, alcohols, DMSO, DMF and others

Packing

Glass vials of 5 – 10 mL.

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