

Technical Data Sheet

QDot™ SharpGreen Perovskite Quantum Dots

Version 3.0

Revised Date 14/05/2020

Introduction and product highlights

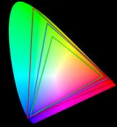



QDot™ SharpGreen Perovskite QDs are specifically developed to meet the requirements of display and sensor industry for down-converting materials. The material has superior optical properties alongside with high reliability. It has emission 520-535 nm (depending on the used concentration), high PLQY (up to 80-100 %) and narrow FWHM (< 20-25 nm). These QDs can be processed at the temperatures up to 100 °C in air. The material has high reliability under heat, light and humidity. QDot™ SharpGreen Perovskite QDs embedded in polymer film retain > 70-80 % of initial photoluminescence within 1000 hours of exposing by heat (85 °C and blue light 10 mW/cm² exposure), high relative humidity (90 % RH at 60 °C) and high flux exposure (150 mW/cm²). QDot™ SharpGreen Perovskite QDs offer the following advantages:

1. Sharp and bright green emission at 520-535 nm, narrow FWHM (< 20-25 nm) and PLQY (up to 80-100 %)
2. High reliability under heat, humidity and high flux (embedded inside polymer film form)
3. Short PL lifetime < 10 ns

Application fields

QDot™ SharpGreen Perovskite QDs can be used as a down-converting materials in:

1. Displays with various types: LCD backlighting, LCD color filters, color filters in OLED and μ LEDs
2. Image sensors for high energy photons sensing: X-ray scintillation, UV light sensing

<p>QD displays backlighting</p> <p>Enhances color gamut for HDR displays</p> 	<p>QD color filters</p> <p>Printable inks to be used as color filters on blue OLEDs, μLEDs and blue LCD pixels</p> 
<p>UV sensors</p> <p>Increases UV sensitivity of Si based photodetectors</p> 	<p>X-ray scintillation</p> <p>High-efficiency scintillator material for X-ray detection</p> 

Specification of QDot™ SharpGreen Perovskite QDs

Catalog Name	QDot™ SharpGreen QDs paste	QDot™ SharpGreen QDs dispersion			
Application	To be embedded inside polymer films for LCD backlighting or sensors	Highly dispersible QDs to be printed on top of substrates for color filters application in OLEDs, μ LEDs or sensors			
Type	Perovskite Quantum Dots ABX3 with treatment and shelling				
Form	Paste	Dispersion in UV curable resin (20 mg/mL)			
Appearance	Yellow paste	Yellow-green liquid			
Emission peak	520 - 535 nm (depending on concentration)				
	Abs	1	2	3	4
	Em peak	520 nm	525 nm	530 nm	535 nm
FWHM	≤ 25 nm				
PLQY (Abs=0.1)	> 80 %				
Dispersibility in solvents	Should be used with viscous (> 2000 cps) nonpolar polymers solutions (PMMA, PS, etc.) or UV curable resins				

Absorption and emission spectra

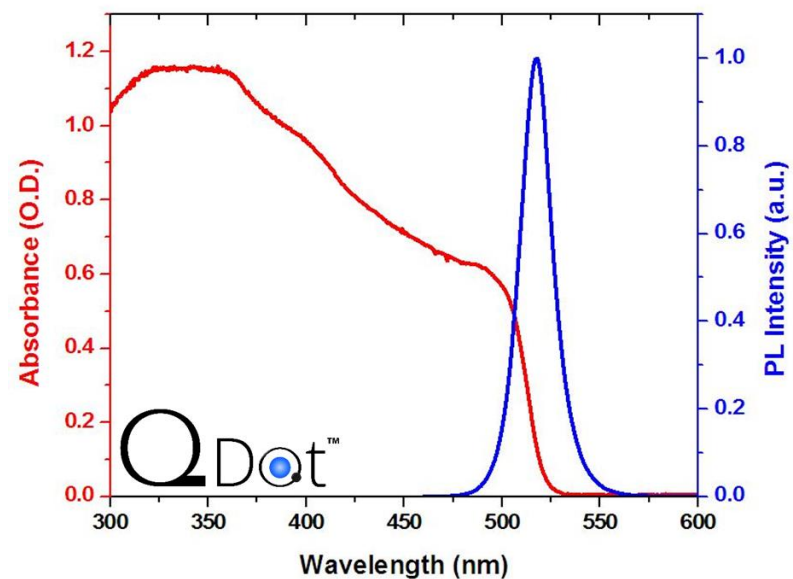
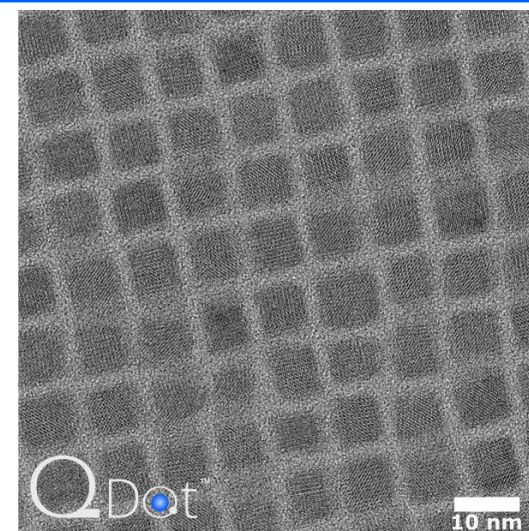


Photo of dispersion in toluene under UV light

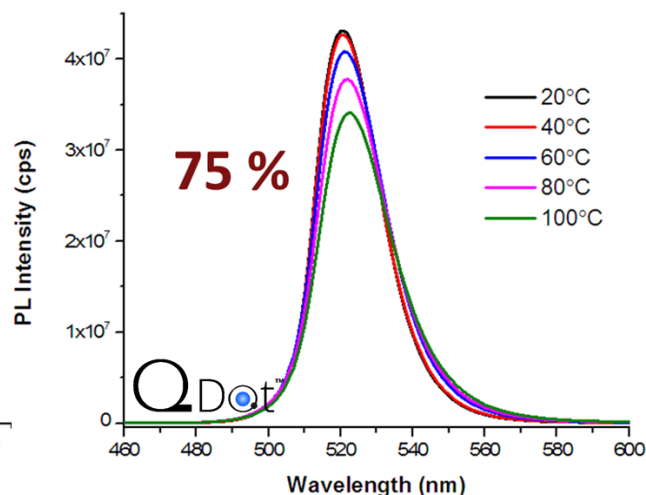
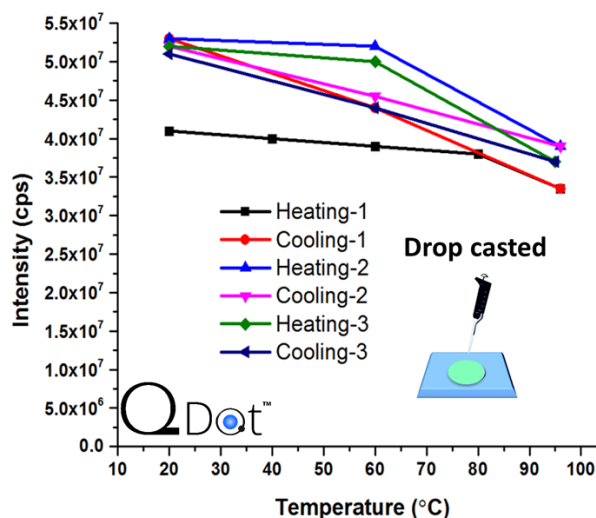


TEM image



Thermal stability

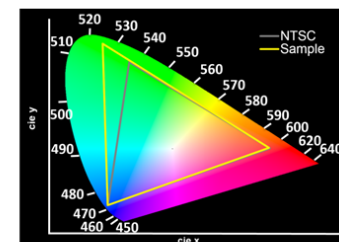
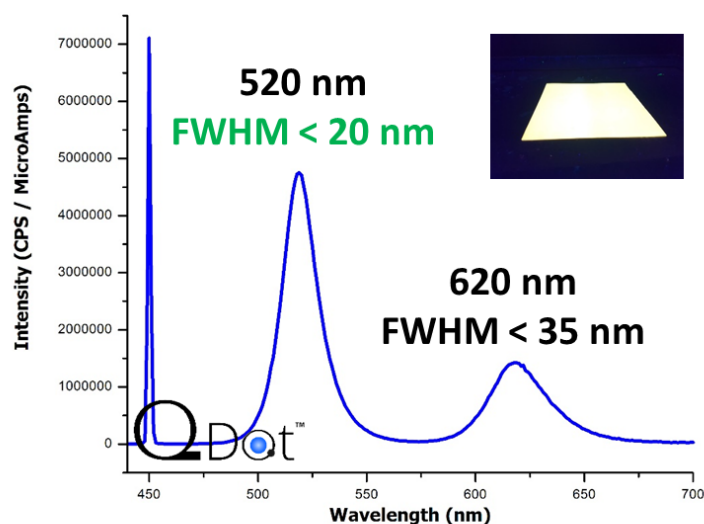
QDot™ SharpGreen Perovskite QDs are stable in air at 100 °C. The material drop casted on a glass substrate retains 75 % of its initial PL at 100 °C and recovers its PL completely after cooling to room temperature even during several cycles hearing-cooling.



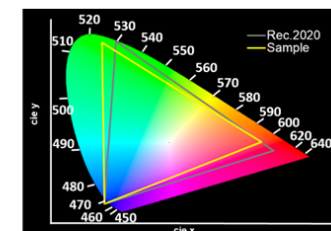
[Check out QDot™ SharpGreen Perovskite QDs Film \(emission 520-535 nm\)!](#)

Prototyping for LCD backlighting

The polymer film containing the mixture of QDot™ SharpGreen Perovskite QDs (Pb content < 1000 ppm) and red CdSe/ZnS QDs (Cd content < 100 ppm) with thickness 200 μm was laminated by barrier films from both sides (50 μm thickness, VWTR < 0.001 g/m²-day @ 20 °C). According to the CIE 1931 color spaces, using QDot™ SharpGreen QDs, we can achieve 120% of NTSC area and > 90 % of Rec.2020 standard. The results show promising application of QDot™ SharpGreen QDs for LCD backlighting that is compliant with RoHS regulations.



120 % of NTSC area



> 90 % of Rec 2020

Notes for handling

Shelf Life 12 months. Suggest use within 6 months of purchase. Shipping temperature 2-25 °C. Store temperature 2-25 °C. Do not freeze. Store in DARK, in airtight sealed packaging or in a glovebox under N₂. Avoid a long term contact with air.

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