Quantum SOLUTIONS™

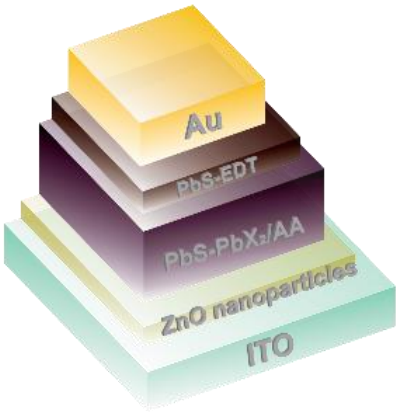
QDot™ PbS Quantum Dots for Solar Cell

QDot™ PbS QDs can be utilised in solar cells to capture more solar spectrum in the near infrared range. The QDs' absorbance wavelength in the NIR range can be tuned, making the QDs promising for tandem solar cells made with other materials, such as silicon or perovskite solar cells. Current development of a stand alone PbS solar cell has already achieved 10% certified efficiencies.

BENEFITS:

- Broad tunable absorption in near infrared range from 700 to 2300 nm
- Enables solution and room temperature processable solar cells
- Can be used in tandem with other solar cell technology such as silicon or perovskite, adding up to 5% to the total power conversion efficiency.

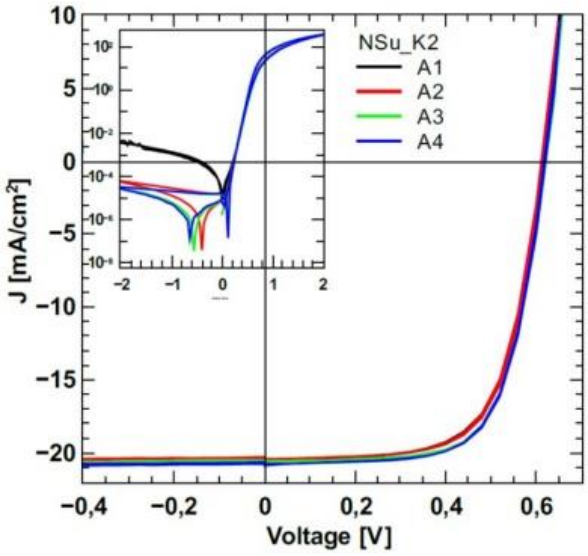
Solar cell structure with QDot™ PbS QDs



DEVICE EXAMPLE:

QDot™ PbS QDs with absorption 920 nm (QDot™ PbS-920-abs) were used as an active layer in the solar cell with gold electrodes and a ZnO electron transporting layer. QDot™ PbS QDs treated with PbI2/PbBr2 and ammonium acetate were deposited by spin coating as an active layer. For a hole transporting layer, layer processing consisted of ligands exchanged QDot™ PbS QDs with 1,2-EDT was used.

The device absorbs the light through all visible spectra up to NIR light. The solar cell produced using using QDot™ PbS QDs shows promising power conversion efficiencies of up to 8.77%.



SOLAR CELL PERFORMANCE:

Parameter	Typical values
Absorption range	Through all visible up to NIR (tunable from 700 nm to 2500 nm)
PCE	8-9 %

Measurement	Jsc	Voc	FF	PCE	Area
A-1	20.66	0.62	0.66	8.45	0.10
A-2	20.54	0.61	0.67	8.45	0.10
A-3	20.68	0.62	0.68	8.69	0.10
A-4	20.88	0.62	0.68	8.77	0.10

Products portfolio:

- **QDot™ PbS Quantum Dots**

PbS Quantum Dots, oleic acid capped, 700-2300 nm emission/excitonic absorption peaks

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