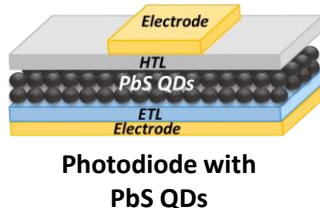
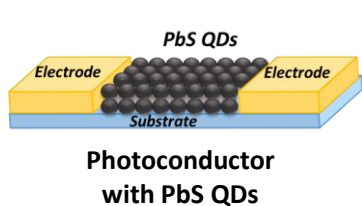


# QDot™ PbS Quantum Dots for NIR Image Sensors

Near infrared sensing is getting very important in such devices as photo-cameras (for biometrics), autonomous cars (obstacles detection), machine vision (quality control and product inspection), AR and VR (for eyes tracking), in night vision and surveillance. Current active NIR absorbers, such as InGaAs and Ge, have high cost of production (high temperature epitaxial method) and cannot be integrated on a Si-based integrated read out circuit (ROIC). QDot™ PbS QDs have higher sensitivity, wider absorption range and compatibility with Si-based sensors.

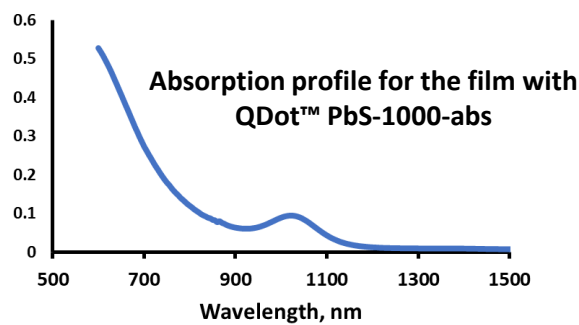
## BENEFITS:

- Broad tunable absorption in NIR range from 700 to 2000 nm
- Superior photoelectrical properties with high devices EQE and detectivity
- Facile integration with Si-based sensors (CMOS or Si photodiode) by solution spin-coating



## DEVICE EXAMPLE:

QDot™ PbS QDs were used as an active layer in the photoconductor with gold electrodes. QDot™ PbS QDs were deposited by spin coating (5-10 layers). Each layer processing consisted of spin coating of PbS QDs (octane, 50 mg/mL), followed by ligands exchange with 1,2-EDT and washing with methanol.



## PERFORMANCE:

Material	QDot™ PbS Quantum Dots
Absorption range	Through all visible up to NIR (tunable from 700 nm to 2000 nm)
Particle sizes	From 2 to 10 nm depending on the required absorption profile
Devices typical EQE	5-40 % upon excitation in NIR
Devices typical response time	< 50 $\mu$ s
Devices typical specific detectivity	up to $1 \times 10^{11}$ cm $\cdot$ Hz $^{1/2}$ /W

The device absorbs the light through all visible spectra up to NIR light (tunable from 700 – 2000 nm). QDot™ PbS QDs device current linearly depends on the light intensity. The typical response time for devices is < 50  $\mu$ s, but can reach < 5  $\mu$ s upon devices special processing. The EQE can reach up to 40 % and typical specific detectivity is up to  $1 \times 10^{11}$  cm $\cdot$ Hz $^{1/2}$ /W.

## Products portfolio:

- QDot™ PbS Quantum Dots  
PbS Quantum Dots, oleic acid capped, 700-2000 nm emission/excitonic absorption peaks

### I-V curves for QDot™ PbS-1000-abs under 1000 nm laser

