

LED

V

3, 4
(QW)

0 quantum dot (QD), 1

quantum wire
LED

2

가

, QD

capping agent

QD

, QD

QD

LED

가

1. Core/Shell

QD, QW

passivation

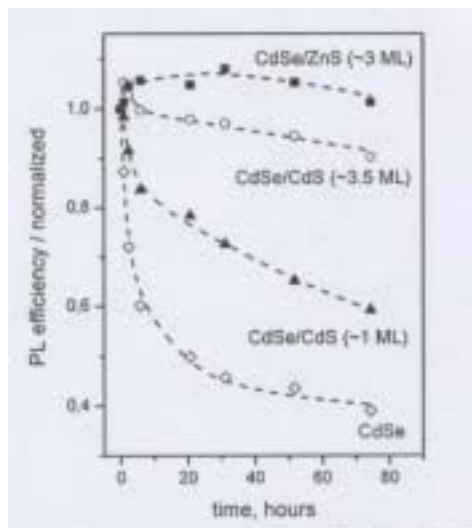
(quantum yield, QY)

. CdSe

CdSe (core)

QD trioctylphosphine oxide (TOPO)가 QD

organic ligand QD



1 UV illumination (366 nm)

CdSe,

CdSe/CdS, CdSe/ZnS QD

QY

CdS, ZnS

band gap

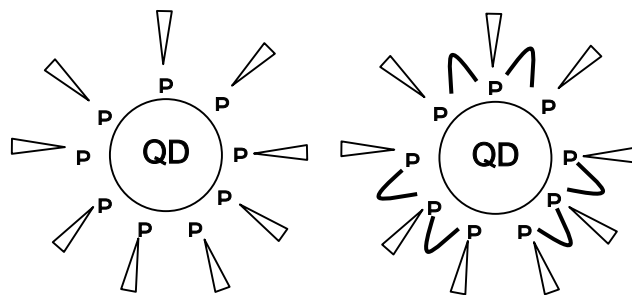
CdSe QD

1 ~ 3

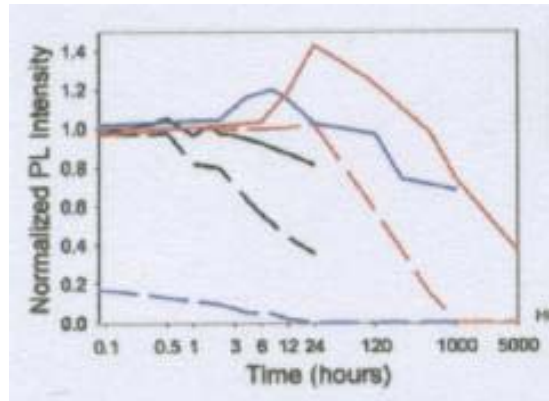
monolayer 가 CdSe/CdS (core/shell) QD가 QY
 Core/shell QD QY 1
 UV QY가 core
 CdSe 20 QY가 50% CdS
 shell 3 monolayer 가 80 QY가
 .[1] CdSe QD UV illumination QY QD
 Absorption spectrum
 QY hole CdSe photo-
 catalytic organic ligand
 core/shell QD LED 가

2. Capping

QD passivation TOPO alkyl mono-phosphine
 , QD
 TOPO가 QD passivation
 TOPO passivation
 QD QD가 UV
 TOPO가 QY
 oligomeric phosphine . [2] 2 가 가 alkyl-
 phosphine 3 가 cross-linker oligomeric phosphine (OP) QD
 passivation (3 -) TOPO QD (3
 -) photoluminescence , QY,가
 QD THF QY
 QD LED active layer
 QD

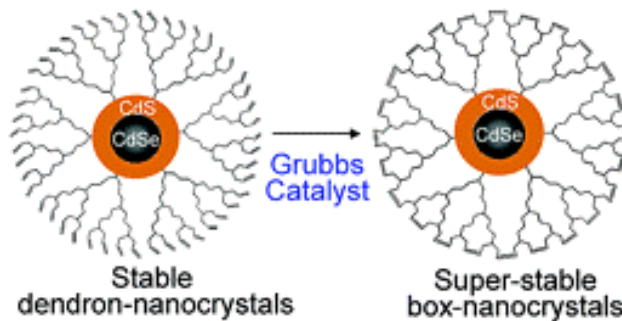


2 Alkyl-monophosphine () oligomeric-phosphine ()
 QD



3 ligand CdSe/ZnS (core/shell) QD
 Photoluminescence : (red-) THF OP coated QD,
 (red-) THF TOPO coated QD

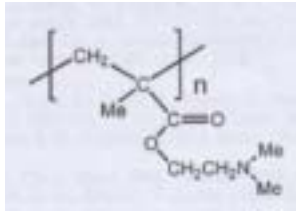
phosphine dendron
 QD , , . 4 dendron
 allyl group cross-linking box type dendron
 . [3]



4 Dendron (3-generation) CdSe/CdS (core/shell) QD
 methathesis

3.

QD 가 ,
 CdTe QD polymerization 가
 octadecyl-*p*-vinylbenzyltrimethylammonium chloride styrene
 monomer polystyrene 10% QY
 QD- 가 가 . [4] QD
 TOPO ammine 가 PDMAEMA -QD
 one-step . [5]



PDMAEMA:

QD QY O₂, H₂O
 . PbSe QD organic device
 O₂, H₂O가 10 ppm QY
 . [6] Nazzal et al. poly methyl methacrylate (PMMA)
 core CdSe, core/shell CdSe/ZnS QD O₂, Air
 514.5 nm laser QY가 30 90% . [7]
 O₂가 CdSe QD CdSeO_x가
 polymer , QD
 LED가 biological label

4. Capping

QD H₂O, O₂ QD
 가 TiO₂, SiO₂ capping . QD
 TOPO hydroxypropyl-phosphine QD -
 OH group TiO₂ sol sol-gel QD
 가 . [8,9] CdTe QD 3-aminopropyltrimethoxy silane
 QD -COOH group silica matrix amine(-NH₂)
 SiO₂ . [10] QD
 matrix QY 가 10%
 QY가
 O₂, H₂O 가
 Cs⁺가 X
 zeolite bulk , zeolite가
 . [11]
 capping QD
 QD
 QD capping 가

. 1992 Beck *et al.* mesoporous
 (1000 m²/g) zeolite 가
 1 nm QD
 mesoporous 3~10 nm
 QD 1g 0.5 cm³ 가
 capping QD . MCM-41, SBA-
 15, disordered mesoporous QD QW
 가 [12,13] Device 가
 mesoporous 가
 QD
 capping QD LED

5.

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