

LED

IV

quantum dot

LED device

가 가

quantum dot

Quantum dot 0

1
가

quantum wire

(QW)

lithography

QW

carbon nanotube

wire

가

QW

LED

1. 1 quantum wire

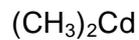
1 QW 2
1

0 quantum dot

1 2

QW

- Colloidal Synthesis



Se

monomer

surfactant

CdSe

QW

U. C. Berkeley

A. P. Alivisatos group

trioctyl phosphine oxide (TOPO)

quantum dot

[1]

hexyl-phosphonic acid (HPA)

TOPO

Cd

surfactant

CdSe

가

HPA

surfactant

wurtzite

c-axis

가

QW가

[2,3]

HPA

20%가

monomer

wire 가 QW

teardrop, tetrapod 가

[4]

quantum yield (QY) quantum dot

CdS ZnS CdSe coating CdSe/CdS/ZnS

(core/interface/shell) QW 가 photochemical

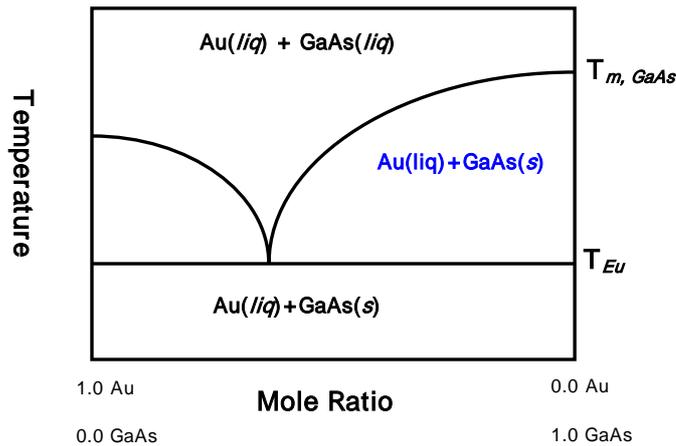
annealing QY가 15~20% 가 [5]

photochemical annealing shell TOPO

hexadecylamine 20~30% QY [6]

- Catalytic Growth

nanocluster가 cluster QW 가



1. (Au) - , GaAs-QW : liq. , s:

1 GaAS QW Eutectic point (T_{Eu})

Au nanocluster Au

GaAs ($T_{m, GaAs}$) Au

GaAs (: $Ga(CH_3)_3, AsH_3$) Au

GaAs가 GaAs Au

QW QW

Au-GaAs 가 GaAs가 Au

QW [7,8] QW

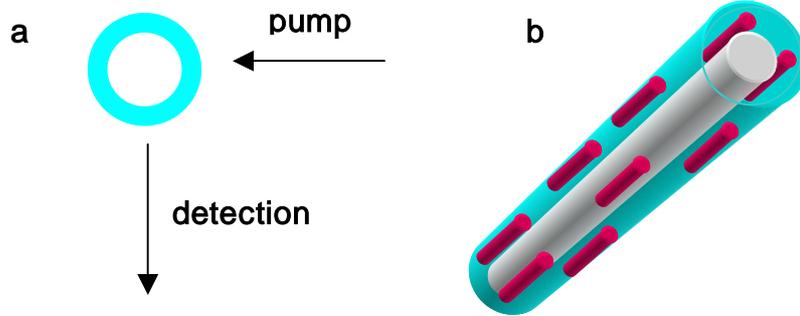
laser assisted, CVD Catalytic growth

anodic aluminum oxide
 (AAO) MCM-41, SBA-15 1 가
 template CdS, CdSe, Zn_xMn_yS, SnO₂
 QW . AAO template
 electrochemical deposition .
 SnO₂ QW AAO [11] metal-CdSe-Metal QW
 - junction . [12]
 NaOH AAO
 free standing QW . Mesoporous Material
 가 3 ~ 10 nm MCM-41, SBA-15
 Zn_xMn_yS QW band gap shift
 가 . [13]

2. Quantum Wire

QW quantum confinement effect가
 linear polarized .
 QW LED device QW
 QW -
 QW QW QW
 QW - QW
 - *QW from Colloidal Synthesis*
 Colloidal CdSe QW surfactant
 colloidal QW
 QW confocal microscope .
 QW linearly polarized . [14]
 CdSe QW PVB polymer 4
 QW 가 . [15] 4
 micro-cavity QW colloidal solution capillary force
 micro-cavity QW가 . [16]
 pumping laser linearly polarized
 CdSe QW tetrapod Au

[17]

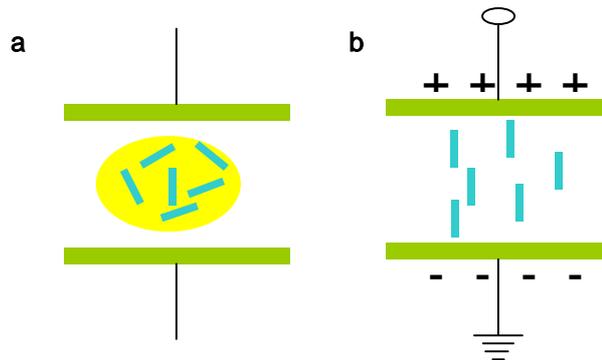


4 (a) micro-cavity QW solution, (b) micro-cavity QW solution
 microfiber . (b) QW solution micro-cavity
 QW CdSe QW: (a) cavity 가

- QW from Catalytic Growth

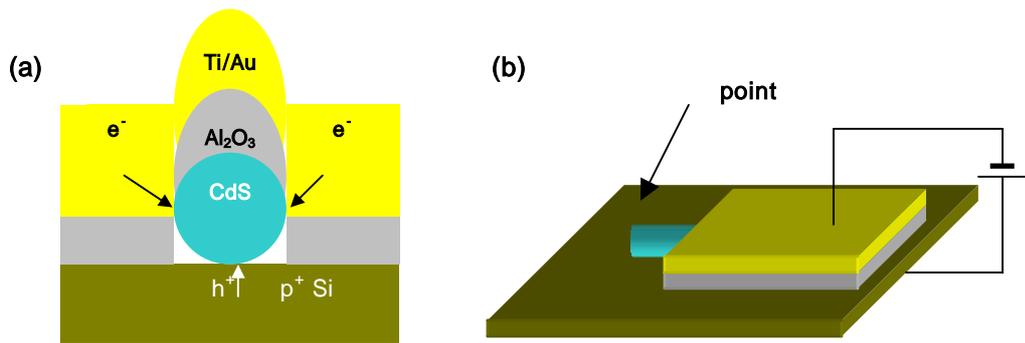
QW wire junction, QW sonication, QW n wire p wire p-n junction, QW 7

QW junction

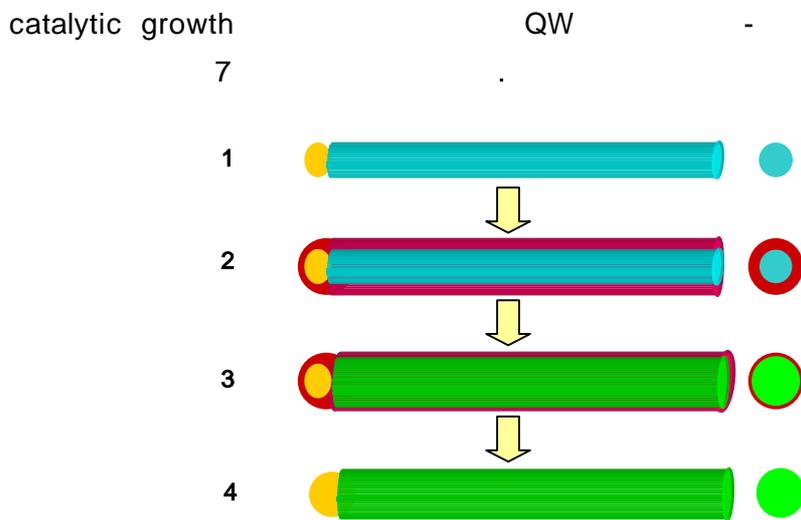


5 orientation, (b) QW : (a) QW random QW

QW p-n junction wave-guide
 , QW ,
 6 QW
 LED device
 QW wave-guide QW
 QW
 metal, QW doped Si . [19]



6. CdS QW LED device : (a) , (b) .



7. CVD QW Ni (red) 3. 550 Ni : 1. Si QW(blue) 2. NiSi QW
 (greedn) 4.

lithography QW CVD Ni

가 QW - 가 catalytic growth
 . [20]
 QW LED
 가 device 가 QW
 - 가
 LED 가

3.

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