Advanced Materials & Devices

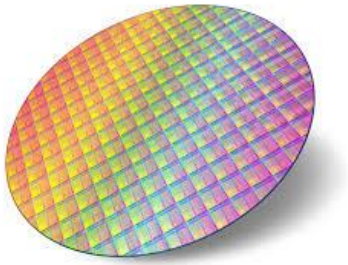
(Nano-Electronics & Photonics: NEP)

(Semiconductor Device Research Laboratory: SDRL)

20-Apr-2019

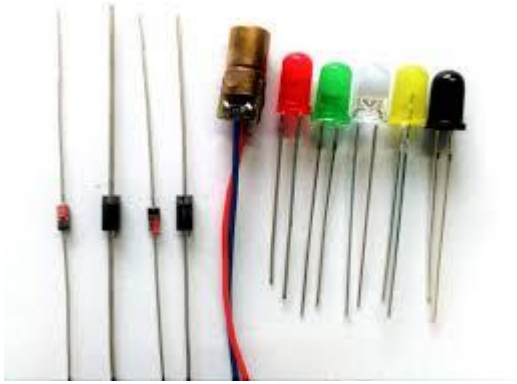
Advanced Materials & Devices

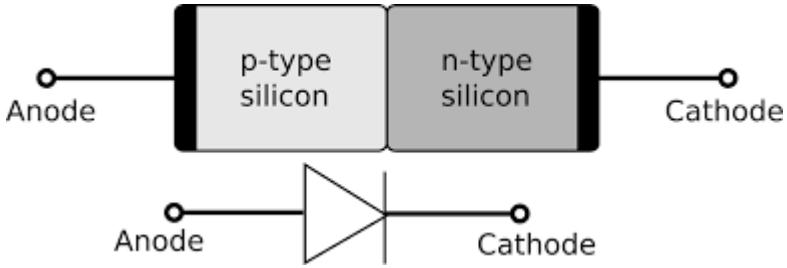
- electronics: IV (Si)
- optoelectronics: III-V compounds (GaAs, InP,...)

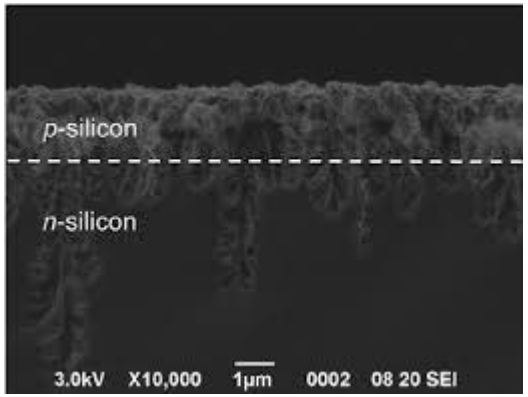


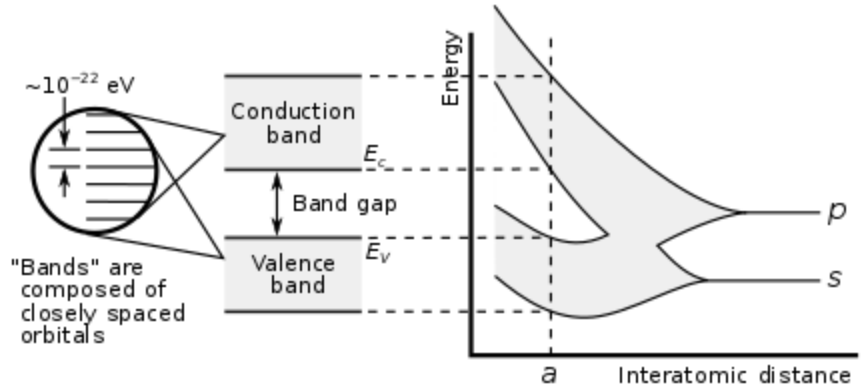
Advanced Materials & Devices

2-Terminal = junctions/diodes: solar cells, LED, lasers...
3-Terminal = transistors (FET, BJT), triggers (SCR, triac)

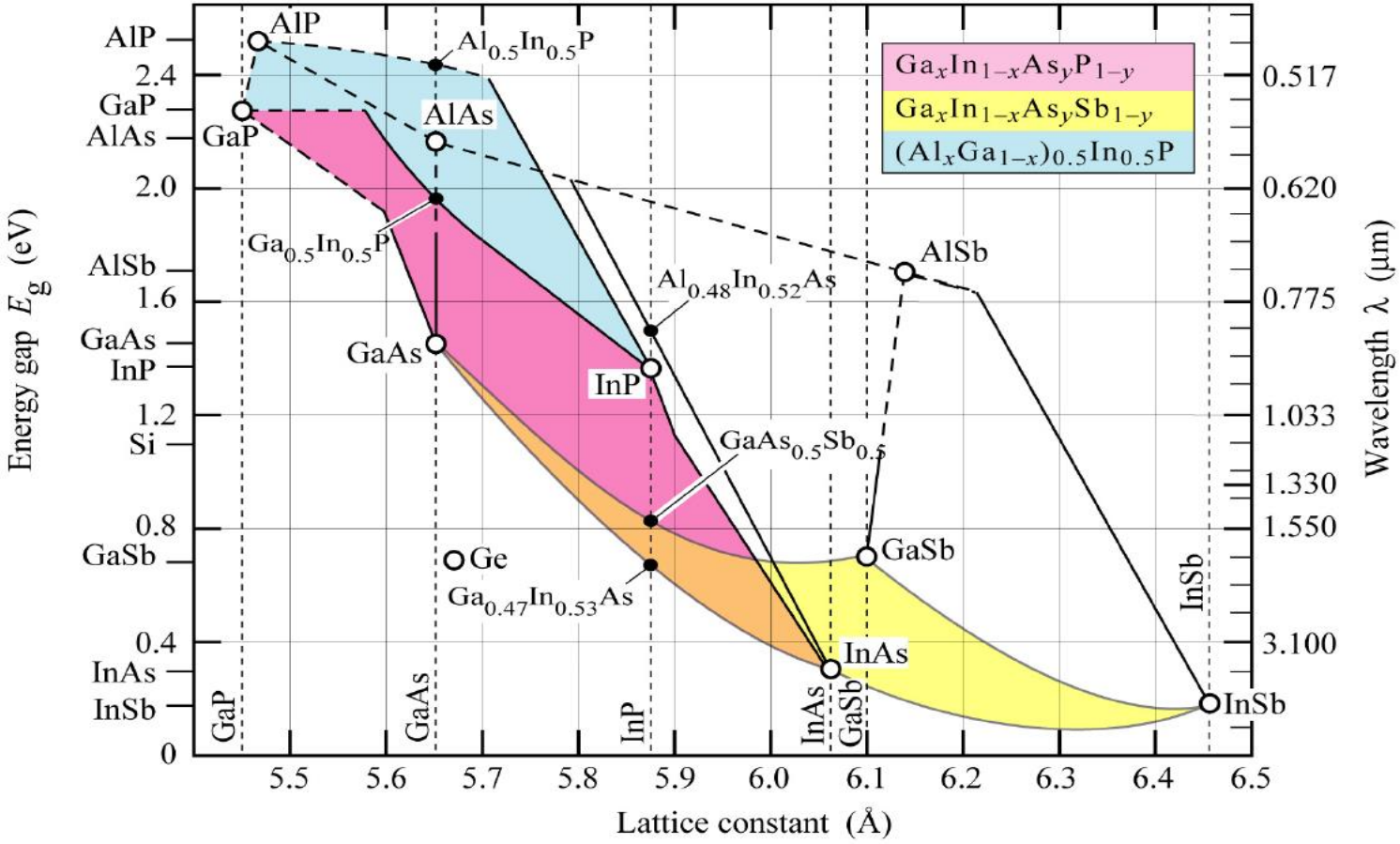








$$E_\gamma = h\nu = \frac{hc}{\lambda}$$



Advanced Materials & Devices

for nanostructures:
energy gap (E_G) also depends on size

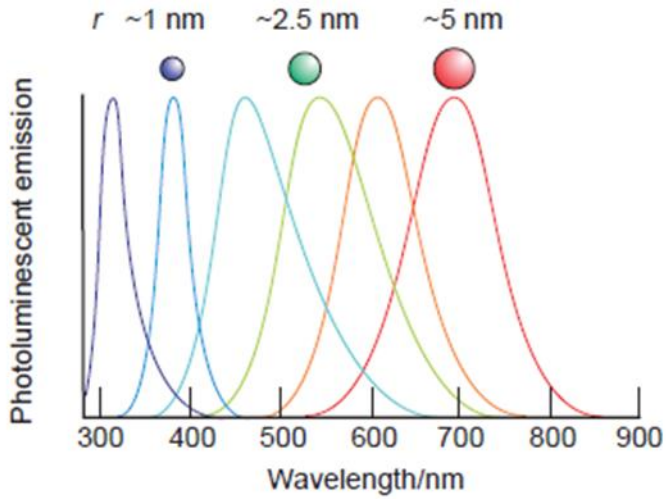


Figure 14.40 Photoluminescent colours emitted by CdS quantum dots.

$$E_\gamma = h\nu = \frac{hc}{\lambda}$$

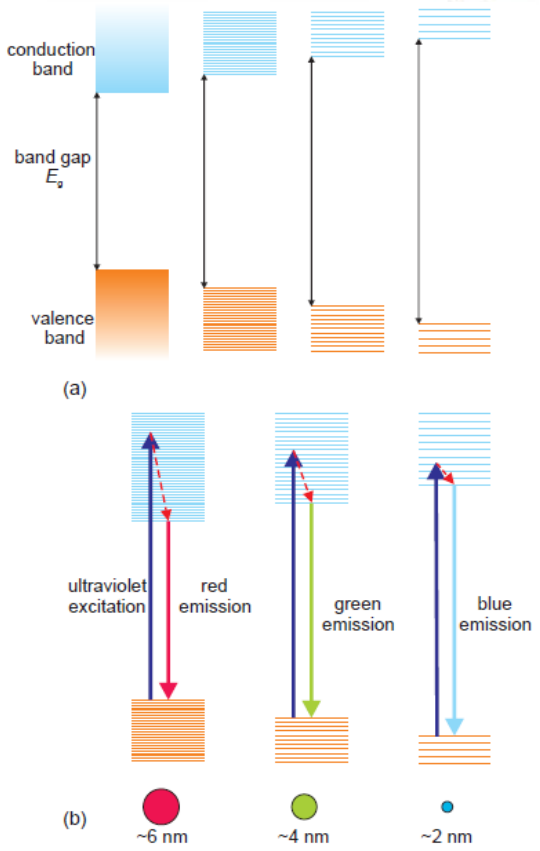
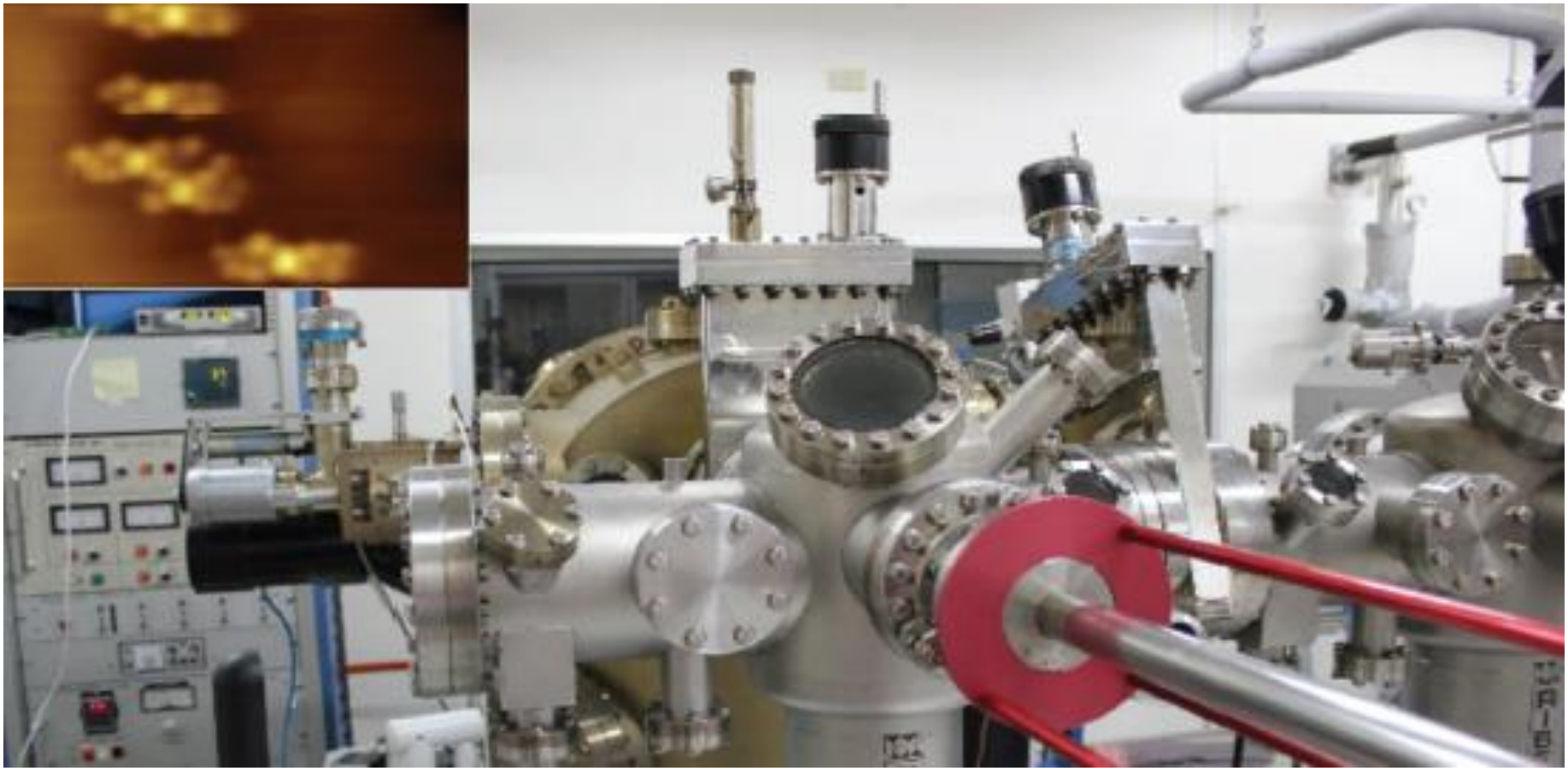


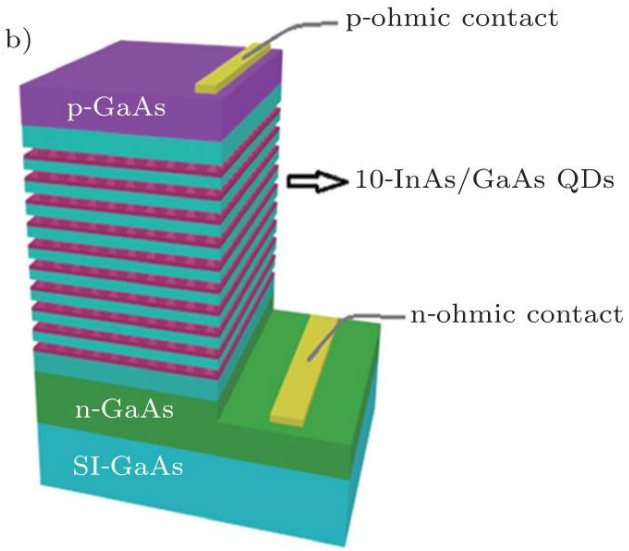
Figure 14.41 Quantum dot colours: (a) the change in band structure of a quantum dot as the diameter falls; (b) fluorescence colours of different diameter dots

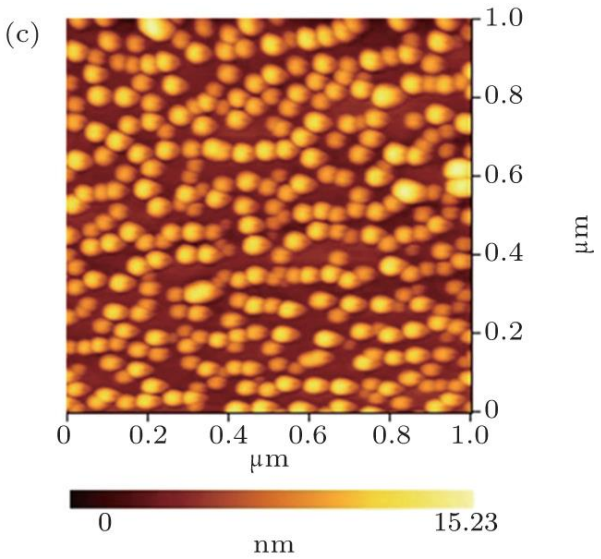
Advanced Materials & Devices

Molecular Beam Epitaxy (MBE) enables crystal growth with subatomic layer precision



Advanced Materials & Devices





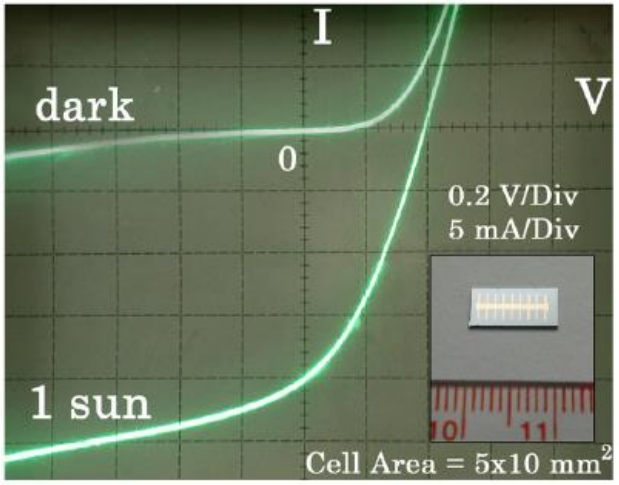
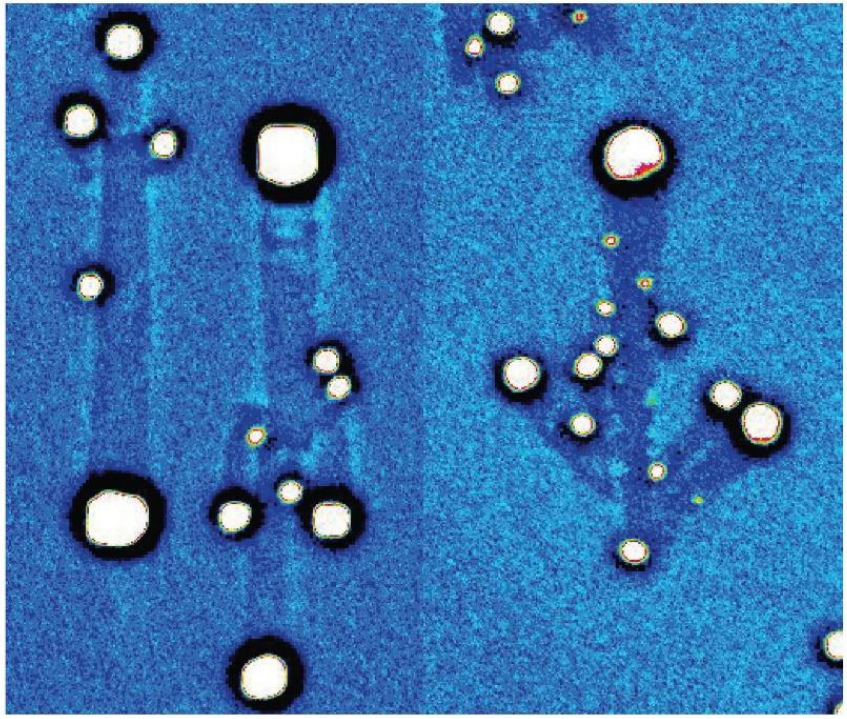


Fig. 5. *I–V* characteristics of 3-stack, high-density QDM solar cell showing a possibility to deliver short-circuit current density as high as 40 mA/cm² (the inset shows the photo of the cell with area of 5 × 10 mm²).

CRYSTAL GROWTH & DESIGN

February 2014
Volume 14
Number 2
pubs.acs.org/crystal

INTEGRATING THE FIELDS OF CRYSTAL ENGINEERING AND CRYSTAL GROWTH FOR THE SYNTHESIS AND APPLICATIONS OF NEW MATERIALS



ACS Publications
MOST TRUSTED. MOST CITED. MOST READ.

www.acs.org

ISSN 1862-6300
Phys. Status Solidi A
216 · No. 1 January 9
(2019)

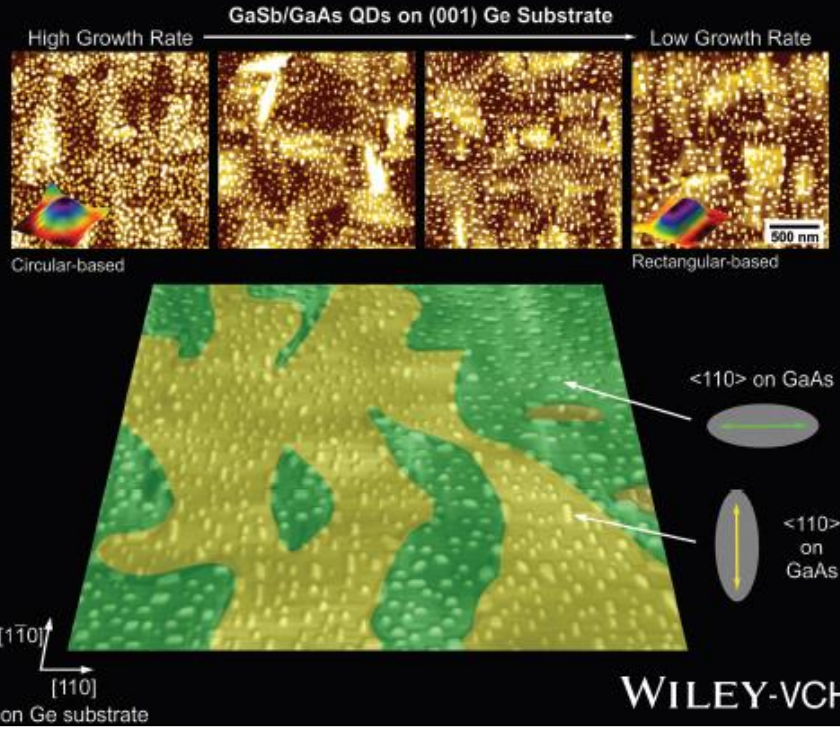
physica status solidi pss a

www.pss-a.com

applications and materials science

1
2019

Special Issue:
Compound Semiconductors
Guest-Edited by Srabanti Chowdhury, Tomas Palacios and Grace (Huili) Xing



WILEY-VCH

AMD (SDRL) Members

(click pix for personal webpages)

Associate Professor
Somchai
Ratanathammaphan