



Synthesis, characterization, and photocurrent of TiO_2

*nanotubes growth
in mixed electrolytes*



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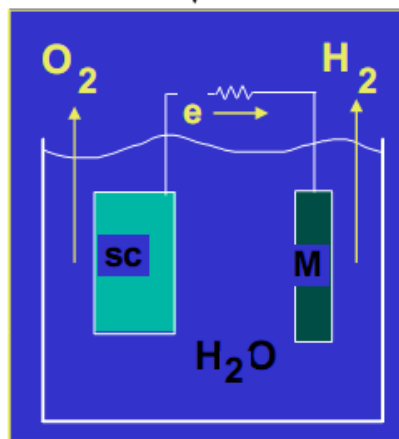
**Rajamangala University of Technology Isan
Sakon-nakon campus**

MOTIV

ATION

Renewable energy

Photoconversion rate

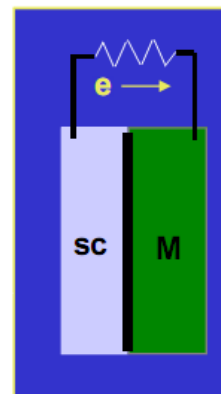


Semiconductor/Liquid
Junctions

Fuel

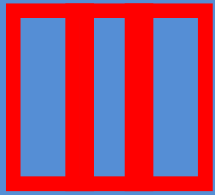


Electricity

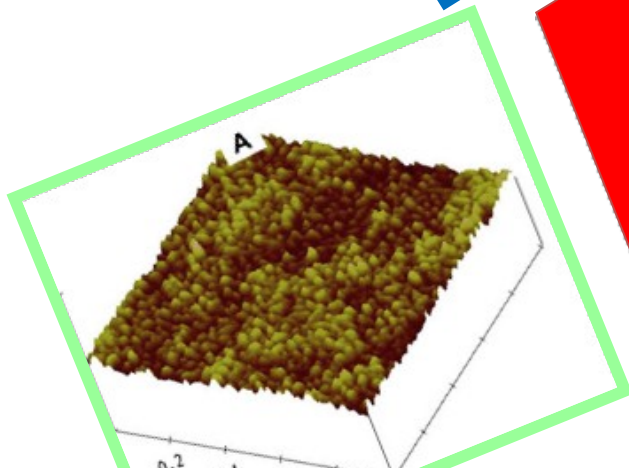
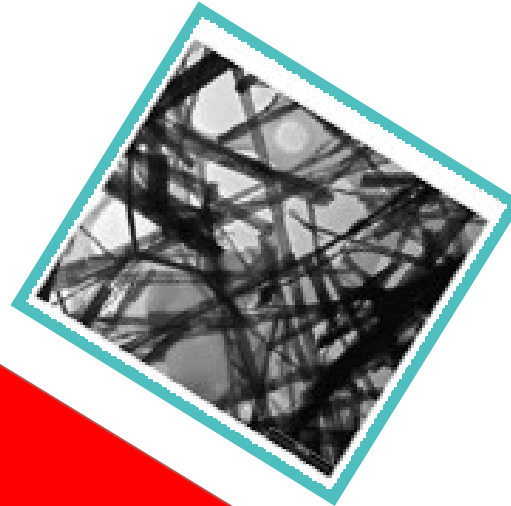
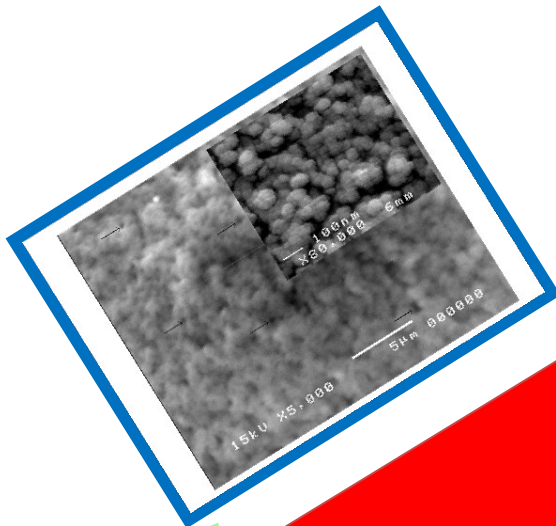


Photovoltaics

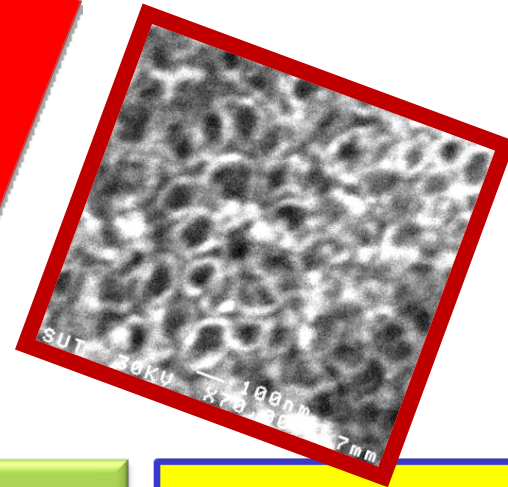




Oxide Semiconductor : Optical and electrical properties



**Form
(Shape)**

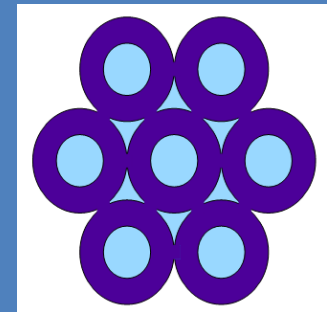
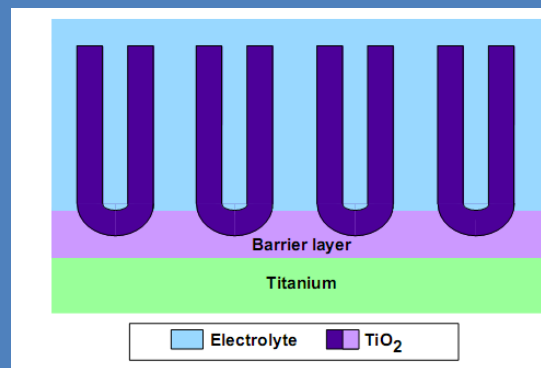
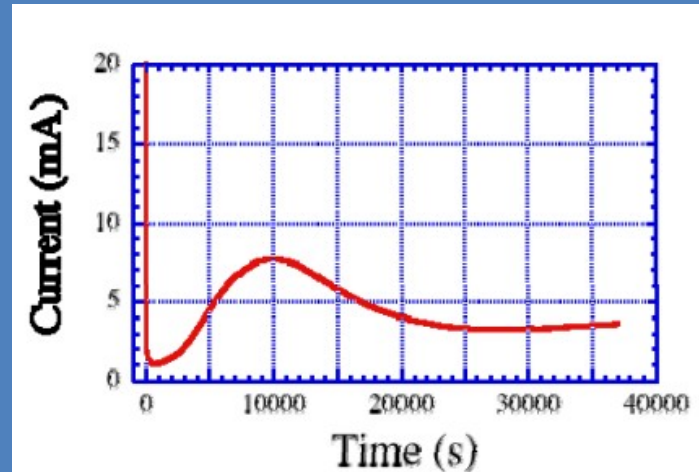
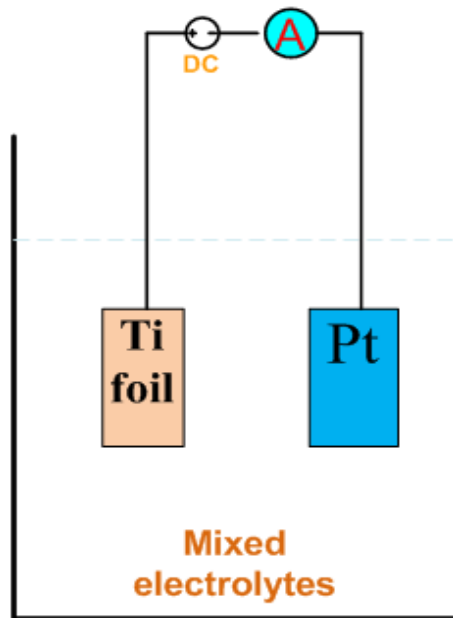


Zero dimension

Morphology

One dimension

Self-organized TiO_2NTs

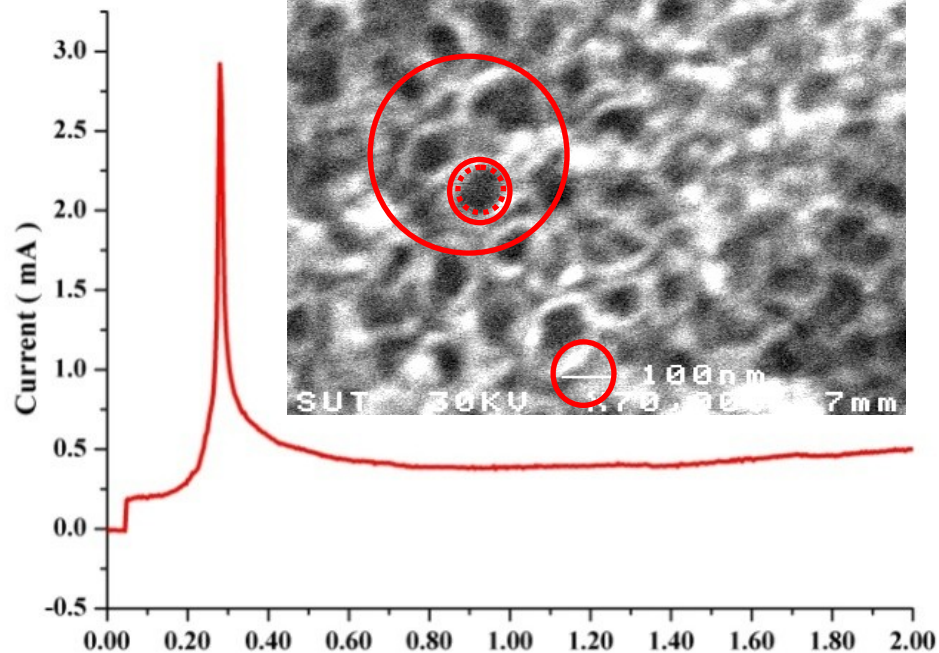


Mixed electrolytes : NH_4F , Na_2SO_4 , and Oxalic acid

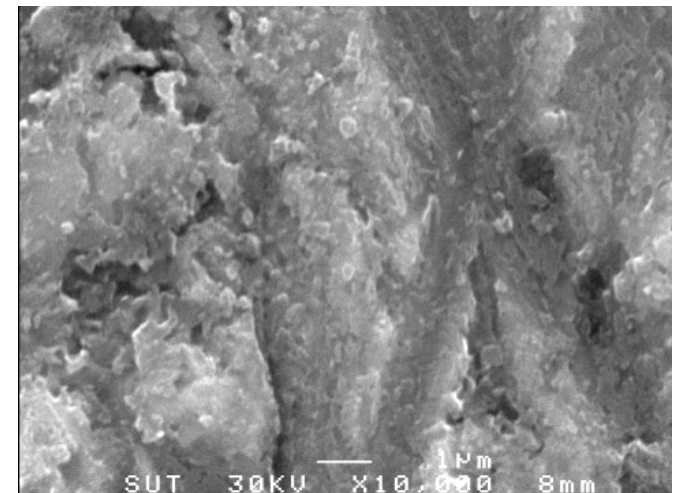
Results : SEM

Mixed electrolytes

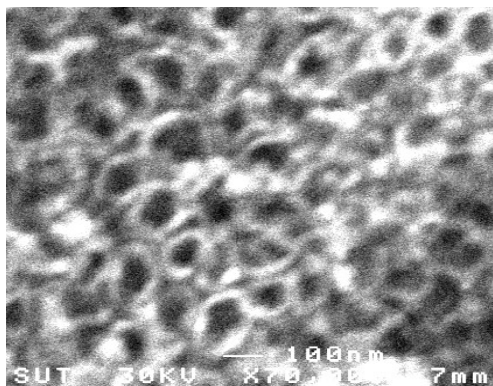
- 80 nm.
- 100nm.



0.5Wt%NH₄F

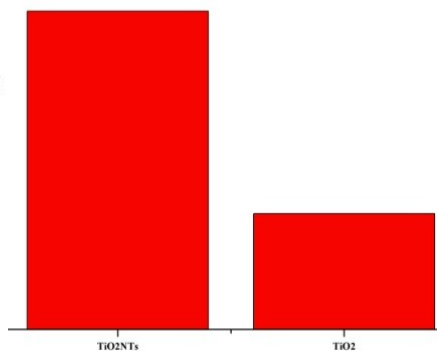
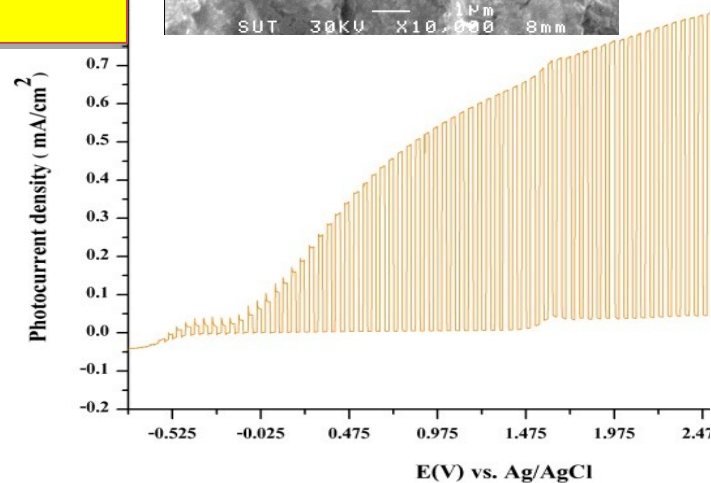
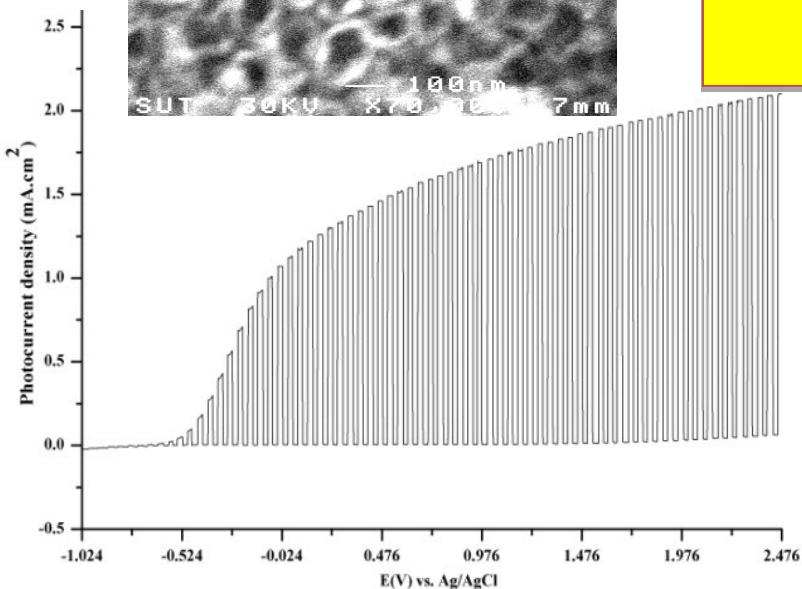
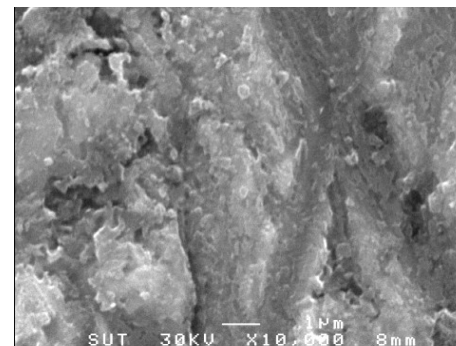


Results : Photocurrent



Photocurrent density

~ 2:1

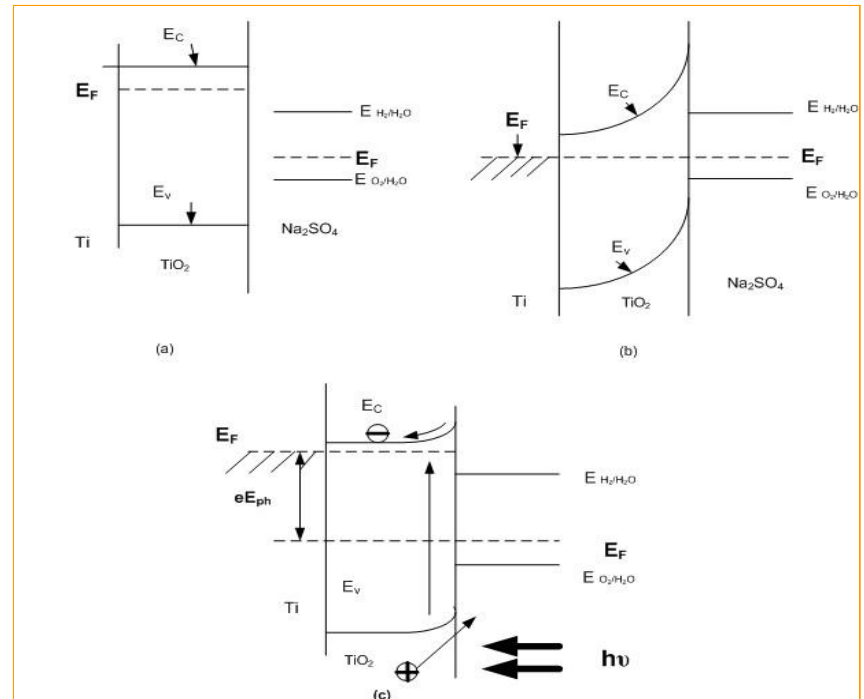
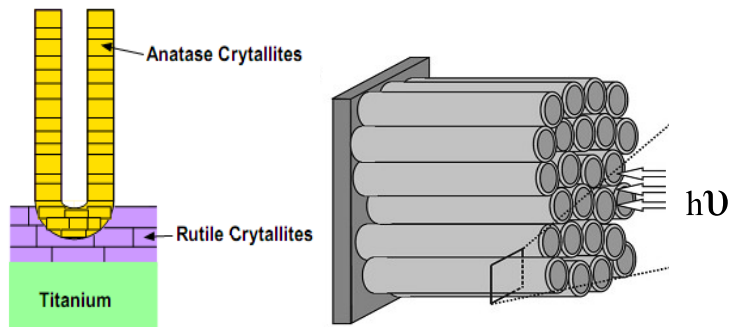


Discussion

TiO₂NTs/Ti foil

- a) Oxidation of Ti metal
- b) Field-assisted dissolution of the oxide
- c) Chemical dissolution of the oxide by fluoride ions

Photocurrent



Conclusion

Anodization method
20 V, 2h

Mixed electrolytes

TiO₂NTs/Ti foil

High surface area
and aspect ratio

electron diffusion length
and rapid transport

0.5Wt%NH₄F

TiO₂/Ti foil

sheet surface area

The optimization of mixed electrolytes condition plays crucial role in the growth TiO₂NTs

Acknowledgement



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**Thank you for your time
and interest**

