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### Research Interests

#### ✧ Dye-Sensitized Solar Cells

- Gel & Solid State Electrolyte
- Quantum-Dot Materials

#### ✧ Self-Assembly Monolayers and Langmuir-Blodgett Films

- Surface Modifications
- Electrochemical Biosensors

### Representative Publications

- ✧ “In-Situ Gelation of Electrolytes for Highly Efficient Gel-State Dye-Sensitized Solar Cells,” *Adv. Mater.*, **23**, 4199 (2011).
- ✧ “Highly Efficient Quantum-Dot-Sensitized Solar Cell Based on Co-sensitization of CdS/CdSe,” *Adv. Funct. Mater.*, **19**, 604 (2009).

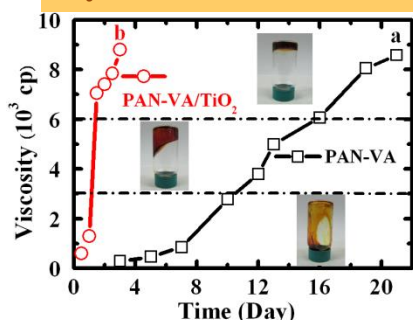
✧ “Manipulation Ordered and Close-Packed Nanoparticle Monolayers at Air/Liquid Interface Coupling Langmuir-Blodgett and Self-assembly Techniques,” *Soft Matter.*, **5**, 2962 (2009).

✧ “Electrodeposition of Au Monolayer on Pt(111) Mediated by Self-Assembly Monolayers,” *J. Am. Chem. Soc.*, **128**(11), 3677 (2006).

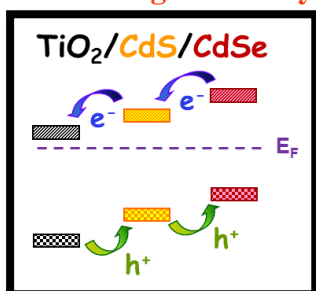
### Honors

- ✧ 2012 Chinese Institute of Engineers, Distinguished Engineering Professor Award.
- ✧ 2011 NCKU Excellent Teaching Award.
- ✧ 2011 NCKU Distinguished Professor.
- ✧ 2008 Taiwan Institute of Chemical Engineers, Professor Tsai-The Lai Award.

### Dye-Sensitized Solar Cells

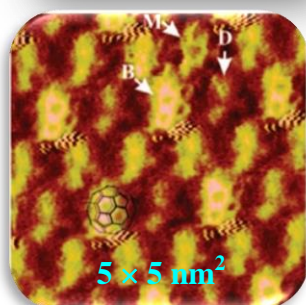
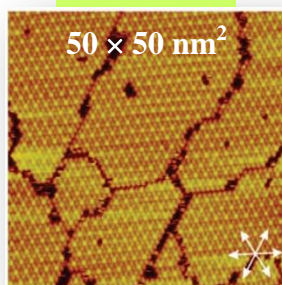


### ACN-based gel electrolyte



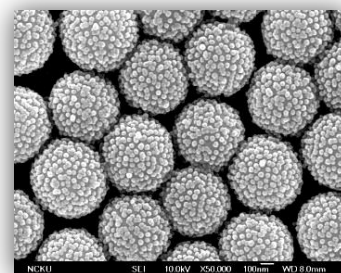
### Cascade semiconductor alignment

### EC-STM

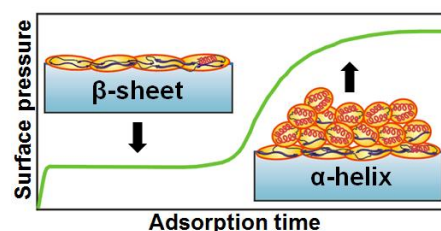


### C<sub>60</sub> adlayer on I/Au(111) surface

### Langmuir-Blodgett Technique

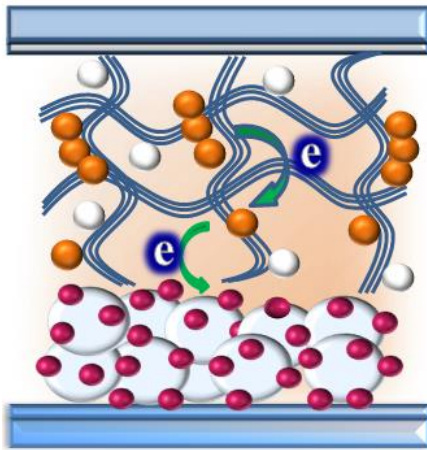


### Raspberry-like SiO<sub>2</sub> particles

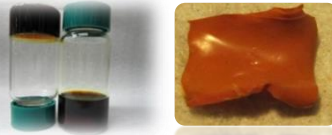


### Conformational control proteins by LB technique

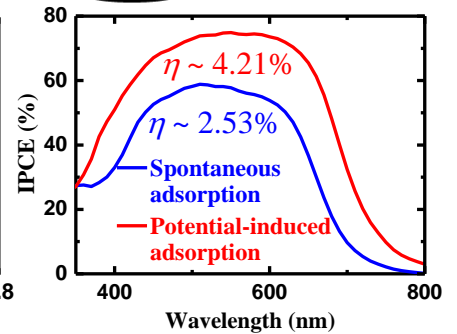
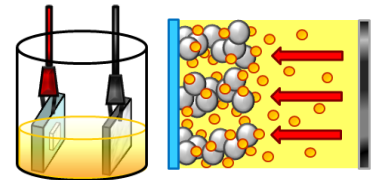
## ☆ Dye-Sensitized Solar Cells



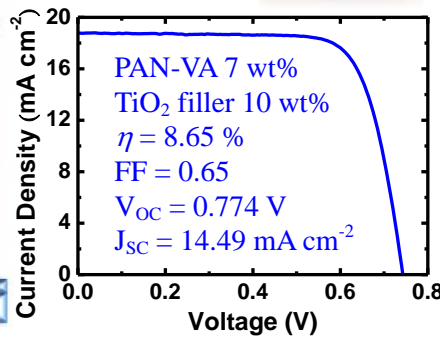
DSSC with polymer gel electrolyte



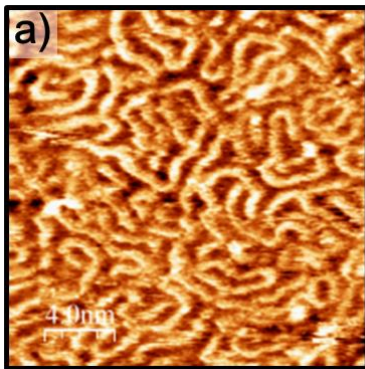
PAN-VA/TiO<sub>2</sub> composite electrolyte



Potential-induced ionic adsorption for QD

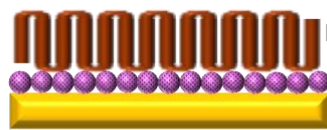
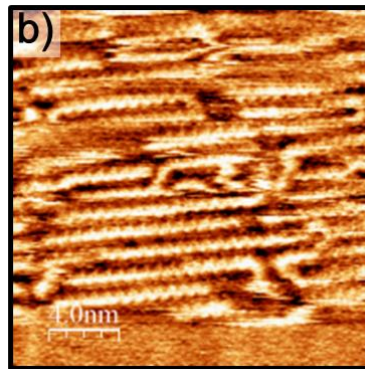


## ☆ In-Situ Electrochemical Scanning Tunneling Microscopy



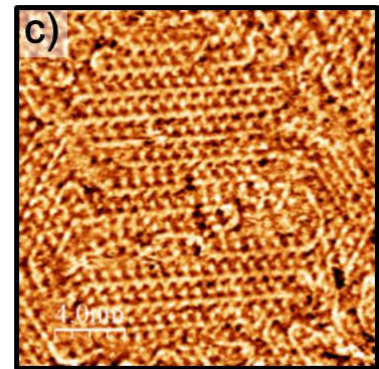
P3HT/Au(111)

Self-assembly of P3HT on Au(111)



P3HT/I-Au(111)

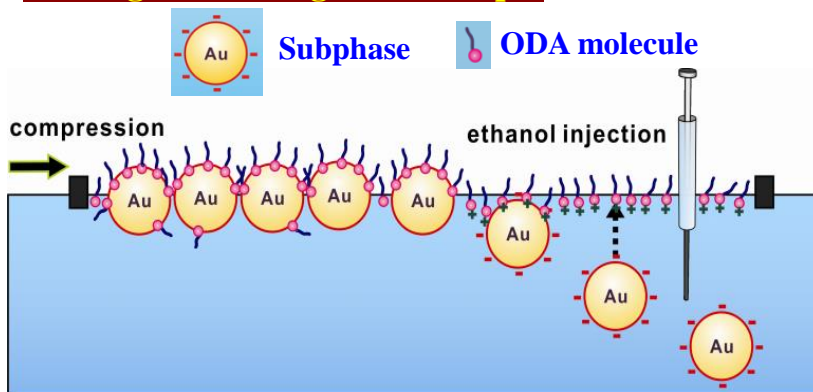
P3HT linear arrangement on iodine-modified Au(111)



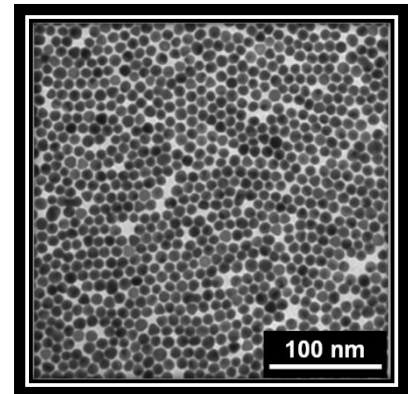
P3HT/I-de-Au(111)

An anodically sweep cause the desorption of iodine.

## ☆ Langmuir-Blodgett Technique



Electrostatic adsorption of ODA monolayers and gold nanoparticles at the air/liquid interface



Close-packed particulate monolayer in the Au/ODA system with 4.2 vol% EtOH