Advanced Chemistry of Materials

Credits: 3

Classroom: B105, Institute of Chemistry, Academia Sinica

Class hour: Every Friday, 2:00 –5:00 p.m.

Week	Date	Topics	Lecturers
1	2/22	Atomically Precise Metallic Nanostructures	Chun-Hong Kuo
2	3/1	Holiday Adjustment	No Class
3	3/8	Atomically Precise Metallic Nanostructures	Chun-Hong Kuo
4	3/15	Surface Characterization for Solid Catalyst	Cedric Po-Wen Chung
5	3/22	Surface Characterization for Solid Catalyst	Cedric Po-Wen Chung
6	3/29	Stimuli-responsive Materials	Shih-Sheng Sun
7	4/5	Ancestor Memorial Day	Holiday
8	4/12	Stimuli-responsive Materials	Shih-Sheng Sun
9	4/19	Midterm Exam	
10	4/26	Materials of Organic Solar Cells	Chin-Ti Chen
11	5/3	Materials of Organic Solar Cells	Chin-Ti Chen
12	5/10	Materials of Organic Solar Cells	Chin-Ti Chen
13	5/17	Self-assembled Monolayers	Yu-Tai Tao
14	5/24	Self-assembled Monolayers	Yu-Tai Tao
15	5/31	Polymer Chemistry	Hung-Ju Yen
16	6/7	Dragon Boat Festival	Holiday
17	6/14	Polymer Chemistry	Hung-Ju Yen
18	6/21	Final Exam	

Course Syllabus

(1) Atomically Precise Metallic Nanostructures (**Chun-Hong Kuo**)
Morphosynthesis & Analysis
Catalytic Energy Conversion

(2) Surface Characterization for Solid Catalyst (**Cedric Po-Wen Chung**)
Physical/Chemical Surface Characterization for Solid Catalyst
In-situ FT_IR Application for Solid Catalyst

(3) Stimuli-responsive materials (**Shih-Sheng Sun**)
Intermolecular interactions and Molecular Recognition
Stimuli-responsive soft materials
Stimuli-responsive luminescent materials

(4) Polymer Chemistry (**Hung-Ju Yen**)
Basic concept of polymers and review their synthetic approaches.
Material sources and polymerizations for conventional and engineering polymers.
Synthesis and applications of high-performance polymers.

(5) Organic Thin Films by Self-assembly-Structure and applications (**Yu-Tai Tao**)
Langmuir Monolayers and Langmuir-Blodgett Multilayers
Self-Assembled Monolayers (SAMS)：
->Carboxylic acids on oxide surfaces
->Alkylsilanes on hydroxylated surfaces
->Organothiol on coinage metals
Mixed monolayers
Multilayers
Monolayer-protected clusters(MPCs)
Patterning of surfaces
->Soft lithography
->Dip-pen nanolithography
Sensor applications
Molecular electronics
Others

(6) Materials of Organic Solar Cells (**Chin-Ti Chen**)
Inorganic semiconducting materials for solar cells
Organic photovoltaic (OPV)– Part 1 Organic small molecular materials
Organic photovoltaic (OPV) – Part 2 Polymer materials
Materials for dye sensitized solar cell (DSSC)
Materials for perovskite solar cell (PVSC)