

Advanced Chemistry of Materials

Credits: 3

Classroom: B105, Institute of Chemistry, Academia Sinica

Class hour: Every Tuesday, 9:00 a.m. –12:00 p.m.

Week	Date	Topics	Lecturers
1	2/23	Atomically Precise Metallic Nanostructures	Chun-Hong Kuo
2	3/2	Atomically Precise Metallic Nanostructures	Chun-Hong Kuo
3	3/9	Atomically Precise Metallic Nanostructures	Chun-Hong Kuo
4	3/16	Surface Characterization for Solid Catalyst	Cedric Po-Wen Chung
5	3/23	Surface Characterization for Solid Catalyst	Cedric Po-Wen Chung
6	3/30	Stimuli-responsive Materials	Shih-Sheng Sun
7	4/6	Stimuli-responsive Materials	Shih-Sheng Sun
8	4/13	Midterm Exam	
9	4/20	Polymer Chemistry	Hung-Ju Yen
10	4/27	Polymer Chemistry	Hung-Ju Yen
11	5/4	Self-assembled Monolayers	Yu-Tai Tao
12	5/11	Self-assembled Monolayers	Yu-Tai Tao
13	5/18	Materials of Organic Solar Cells	Chin-Ti Chen
14	5/25	Materials of Organic Solar Cells	Chin-Ti Chen
15	6/1	Materials of Organic Solar Cells	Chin-Ti Chen
16	6/8	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
 - >Organothiols 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)