Chemical Engineering

Sheng-Shu Hou (侯聖澍)

Assistant Professor

B.S.	Chemistry, National Cheng Kung University	1991
Ph.D.	Chemical Engineering, National Cheng Kung University	2001

Phone	886-6-2757575-62641
Email	sshou@mail.ncku.edu.tw
Office	Room 93B11, Chemical Engineering Building

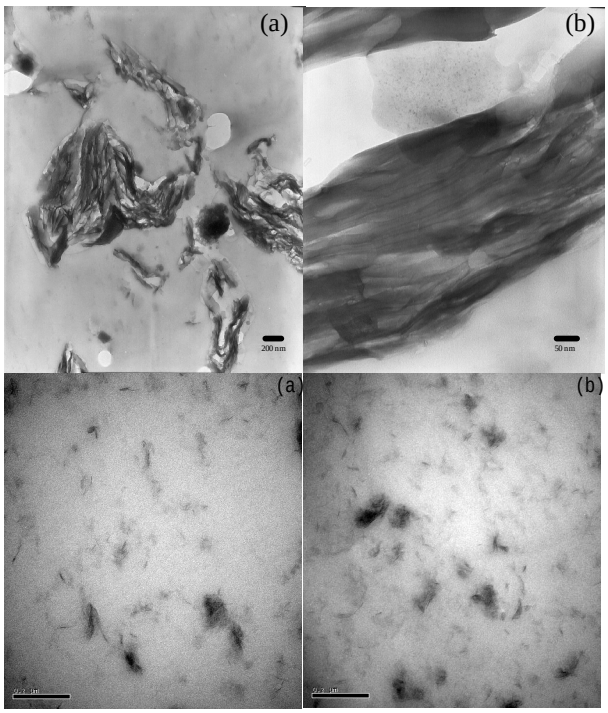
Research Interests:

The broad aim of our research is to prepare and study polymer-inorganic hybrid materials. The nano-size of the incorporated inorganic fillers can induce materials properties which differ significantly from regular polymers. Most recently, our research encompasses several different areas: (1) polymer-clay nanocomposites, (2) polymer/nanocrystalline semiconductor composites, (3) synthesis and application of amphiphilic block copolymers, and (4) using solid-state NMR experiments to study the molecular structure and dynamics of the hybrid materials.

(1) Polymer-clay nanocomposites

Ÿ The surface of montmorillonite clay has been modified by tyramine whose phenyl group may be hydrogen bonded to the carbonyl groups in PMMA. The strong H-bonding interaction renders PMMA chains intercalate into the silicate galleries.

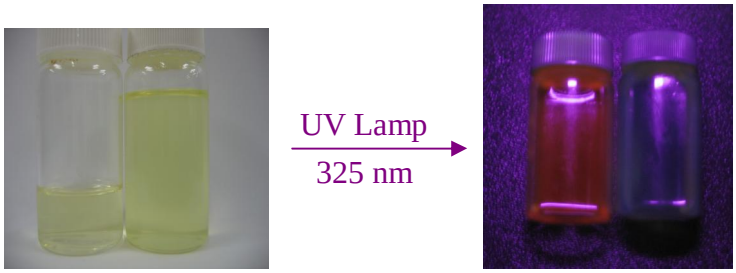
Ÿ PMMA is known to be compatible with amorphous PEO. By taking advantage of the characteristic of mutual miscibility, *pristine* laponite clay can be exfoliated in the PMMA/PEO (94/1) blend.



(2) Polymer/nanocrystalline semiconductor composites

Ÿ **Orange: CdS nanocrystallins prepared in the presence of poly (4-(aminomethyl)styrene) solution.**

Ÿ **Blue: *in-situ* preparation of PEO/CdS nanocrystallines in DMF.**

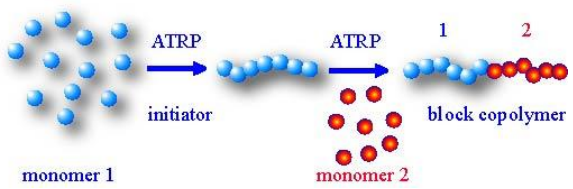


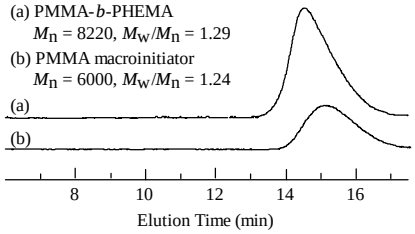
(3) Study and application of amphiphilic block copolymers

Ÿ **Synthesis of amphiphilic block copolymers by Atom Transfer Radical Polymerization (ATRP).**

Ÿ **The study of polymer-inorganic hybrid materials using block copolymers as the templates.**

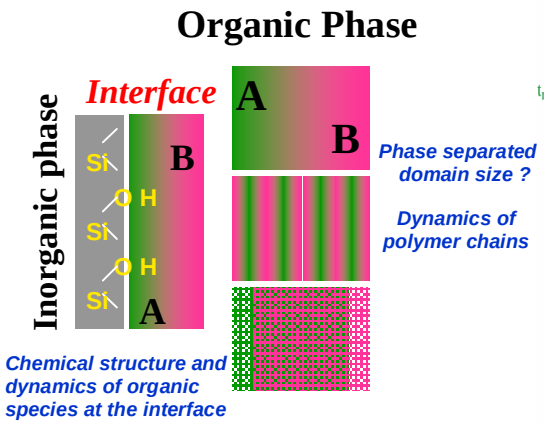
Ÿ **The study of polymer blends composed of amphiphilic block copolymers.**

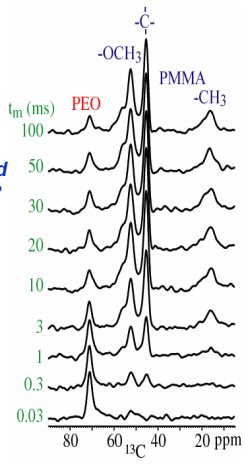




The GPC trace of PMMA- *b*-PHEMA copolymer

(4) Solid-state NMR study of polymer-inorganic hybrid materials





Spin diffusion between PEO and PMMA