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主要研究領域

■ 石墨烯之功能性混摻複合材料

由石墨製備氧化石墨烯，以還原方法製備少層石墨烯，直接作為填充料製備奈米功能性高分子複材，或化學改質後再製備為高添加量且分散良好的高效能複合材料，可賦予或強化高分子基材之，導熱、導電、阻氣、阻水、結晶、機械性質及熱安定…等性質。

■ 光電用聚醯亞胺及其衍生物之合成與分析

合成並分析新穎光電材料聚醯亞胺及其衍生物。例：光阻劑，具良好接著性之聚醯亞胺，及無色、透明性佳之雜環聚醯亞胺。

■ MIP (molecular imprinting) 仿生感測器之研究

以MIP技術合成人工辨識孔並結合微影技術，以製仿生感測器。

Main Research Interests

■ Highly functional polymer/graphene composites

Graphene is a highly electrical and thermal conductive material with a honeycomb structure. Owing to its many outstanding properties, graphene can be a functional component as a reinforcing material in blends with polymers to enhance their thermal conductivity, electrical conductivity, gas and water barrier, crystal mechanical properties, thermal stability and so forth.

■ Synthesis and characterization of novel polyimides

In this research, novel polyimides with potential application in optics and electronics will be synthesized and characterized. For example, polyimide photo resists, polyimides having better adhesion with copper, and colorless, better light transmittance cyclic polyimides.

■ Molecular imprinting sensor

Molecular imprinting technique is employed for creating recognition sites for an analyte molecule in a synthetic polymeric substrate. A molecular imprinting sensor for analytes will be investigated while the techniques of microfabrication and molecular imprinting are combined to construct on-chip devices using photo irradiation of cross-linkable polymers.

代表作 (Selected Publications)

- Jian-He Yang, Shih-Hung Lin, **Yu-Der Lee***, "Preparation and characterization of poly(L-lactide)-graphene composites using the in situ ring-opening polymerization of PLLA with graphene as the initiator", *Journal of Materials Chemistry*, 22(21), 10805-10815, 2012.
- Jian-He Yang, **Yu-Der Lee***, "Highly electrically conductive rGO/PVA composites with a network dispersive nanostructure", *Journal of Materials Chemistry*, 22(17), 8512-8517, 2012.
- Kuo-Yung, Chang, Li-Wei Cheng, Guan-Huei Ho, Yun-Peng Huang, **Yu-Der Lee**, "Fabrication and characterization of poly(γ -glutamic acid)-graft-chondroitin sulfate/poly caprolactone porous scaffolds for cartilage tissue engineering", *Acta Biomaterialia*, 5(6), 1937-1947, 2009.
- Chang-Hong Ho, Chau-Hui Wang, Chin-I. Lin, **Yu-Der Lee**, "Synthesis and characterization of TPO-PLA copolymer and its behavior as compatibilizer for PLA/TPO blends", *Polymer*, 49(18), 3902-3910, 2008.
- Y.C. Chen, C.C. Tsai, **Y.D. Lee** "Preparation and properties of silylated PTFE/SiO₂ organic-inorganic hybrids via sol-gel process", *Journal of Polymer Science Pat A-polymer chemistry*, 42, 1789-1807, 2004.