



香港城市大學  
City University of Hong Kong

## A discovery-enriched curriculum on polymers and polymer composites through hierarchical structured on-line laboratory mini-projects

**Project Number:** 6000614

**Principal Investigator:** Dr. Chunyi ZHI

**Grant Type:** TDG

### **Abstract:**

Design, fabrication and properties of polymers and their various composites is a subject which needs not only in-class

teaching, but also plenty of experiment opportunities to help student gain enough experiences and understand what they

have learned in class. This is also a field rich for discovery and thus possess high potential to achieve the

Discovery-Enriched Curriculum. However, the field of polymer and their composite is very comprehensive because

various properties, including mechanical, thermal, optical, acoustic and electrical performances of polymers and their

composites can be investigated. Therefore, doing experiments in an ordinary laboratory in one semester can only equip

the students with very limited experience.

This project will explore a method to make the experimental work of polymers and their composites more effective

and easy. Based on the on-line polymer and polymer composite simulation system developed and provided by National

Institute for Materials Science in Japan, I will design a couple of mini-projects with hierarchical structure for the

existing course titled "Composite Materials – with An Introduction to Nanocomposites" (AP4118) and "Polymer &

Composite Materials" (AP6182&8182). These mini-projects will allow students to design various polymers and polymer

composites, followed by investigations on their mechanical and thermal properties. One of the mini-projects will request



香港城市大學  
City University of Hong Kong

the students to arbitrarily design a series polymers with enhanced properties. The results will be used to compare with

each other and/or enrolled in the polymer database managed by National Institute for Materials Science in Japan.

The online laboratory will greatly extend the range of polymers, polymer composites and their properties which can

be investigated through experiments. By arbitrarily designing a series polymers with enhanced properties, the students

can well understand the roles of chains, functional groups or grafts on polymer properties. These designs aim on

encouraging student to discover new materials and properties based on what they have learned in the class. The online

laboratory will be integrated with the existing tutorials and lab sessions.