

Manufacturing Composites/Nanocomposites

Our research and teaching in Composites/Nanocomposites is collaboration between Professors Jose M Castro and Jim Lee (CBE) it has led to development of improved composite material as well as thin nanocomposites films or nano papers.



Prof Castro holds nano reinforced polymeric composites developed in his lab

Basic Research: Processability versus Performance for light weight composite materials.

Adding carbon nano particles such as carbon nano fibers (CNF), the mechanical properties of fiber reinforced polymeric composite materials are improved, at the expense of processability. Our research focuses on developing the best balance between mechanical properties and processability. New methods of incorporating nanoparticles into the fiber reinforced materials are being developed. As a measure of processability the effect of CNF on permeability is measured. Flow simulation is used to decide the best manufacturing strategies.

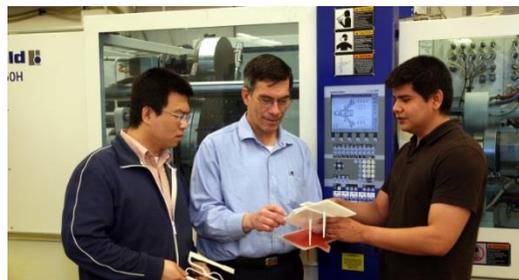
Basic Research: Manufacturing improving quality nanopapers.

Surface functionalization is used to manufacture more stable nanopapers with increased tensile strength and improved conductivity. The nanopaper permeability is measured as an indication of the easiness of impregnation.

Polymer Processing

Our research focuses on developing new processes and or approaches to improve the properties of plastic parts or decrease cycle time. Research in this area is led by Prof Jose M Castro.

In mold coating (IMC) is the Environmentally Friendly manufacturing alternative to priming and painting. It is commonly used in composites manufacturing. We have been working with OMNOVA Solutions to implement this technology to injection molded thermoplastics. Research on material/process optimization focuses on lowering the required process temperature, as well as increasing the material conductivity.



Prof Castro and students holding samples molded using new process that reduces cycle time and improves consistency for injection molded parts

New process development, we have developed a new process to decrease the cycle time of injection molding parts while improving dimensional stability. Its industrial competitor is Micro cellular injection molding (MUCELL). We are developing in collaboration with OMNOVA Solutions a new approach to make thermoplastic parts conductive using nanopaper in mold coating.