

**University of Puerto Rico
Mayagüez, Puerto Rico
Chemistry Department**

Departmental Seminar Program

FRIDAY FEBRUARY 3rd 2012

Q – 123

11:30 AM

By:

Dr. Tze-Chi Jao,

R&D Fellow, Afton Chemical Corporation, Richmond, VA

Unique Properties of Functionalized Olefin Copolymers for Diesel Engine Lubrication

Abstract:

In the early 1990's, diesel engine lubrication in the 1980's had a lot of technical hurdles to be overcome. The lubrication problems were exacerbated by the dramatic increase in the content of soot contaminated in the crankcase oil as the result of EPA regulation limiting the level of permissible particulate emissions to the environment. The increase of soot in the crankcase oil creates two major problems in lubrication - lubricant viscosity thickening and serious wear threatening engine seizure. Special lubricant additive chemistry must be developed to solve this lubrication issue. We used a physical chemical approach that helped develop a functionalized ethylene-propylene copolymer which became the best lubricant additive for dispersing the soot to control the viscosity increase in the lubricant industry. At the same time, the copolymer was also found to be equally good for preventing wear between two sliding diesel engine parts. Though the development of the polymer chemistry that solve the two lubrication problems mentioned here may not be directly relatable to lubrication problems encountered in the biological systems, the concepts of lubricant viscosity increase and wear induced by contaminants like soot are applicable to biological lubrication .