



DIVISION OF POLYMERIC MATERIALS: SCIENCE & ENGINEERING

Cooperative Research Award In Polymer Science And Engineering Sponsored by the Eastman Kodak Company

2021 Award Winners

Eric W. Cochran, R. Christopher Williams

Iowa State University

Donald Sjogren

Seneca Petroleum

The 2021 Cooperative Research Award in Polymer Science & Engineering recognizes the team of researchers from Iowa State University and Seneca Petroleum in their research efforts into biobased thermoplastic polymers. The collaborative research team is represented by Professor Eric W. Cochran, Professor R. Christopher Williams, and Donald Sjogren.

Over the past decade, this team has worked to transform the laboratory curiosity of gel point suppression in controlled radical polymerization into a new family of low-cost biobased branched thermoplastic copolymers. Poly(acrylated epoxidized high oleic soybean oil) (PAEHOSO) is a rubbery polymer that provides crack and rut resistance in pavements formulated with high recycled content and other low cost asphalt sources. PAEHOSO can be produced in soy-based rejuvenating oils that further aid in the rehabilitation of recycled pavements. The polymer/oil cement, known as "BioMAG", is manufactured at nearly 100% atom efficiency without the need for organic solvent or polymer finishing steps. To date, 50 tons of BioMAG have been produced and used in demonstration paving projects in several states throughout the US. The first full-scale commercial batch is planned for Spring 2021 production. Poly(acrylated glycerol) (PAG) can be manufactured from crude glycerol as a water soluble adhesive that displaces PMDI in wood composite materials. The team has shown that PAG adhesives can be spray-applied in the same equipment currently used throughout the industry to yield formaldehyde-free fiberboards with reduced PMDI content. PAG-produced boards are compatible with a coal-free manufacturing process, exceed US and EU standards for strength and water resistance, and have superior machining characteristics.

The team continues to collaborate to scale PAG manufacturing to the multi-ton level to enable full production runs at commercial mills in 2021.



Eric W. Cochran, Iowa State University

Donald Sjogren, Seneca Petroleum

R. Christopher Williams, Iowa State University