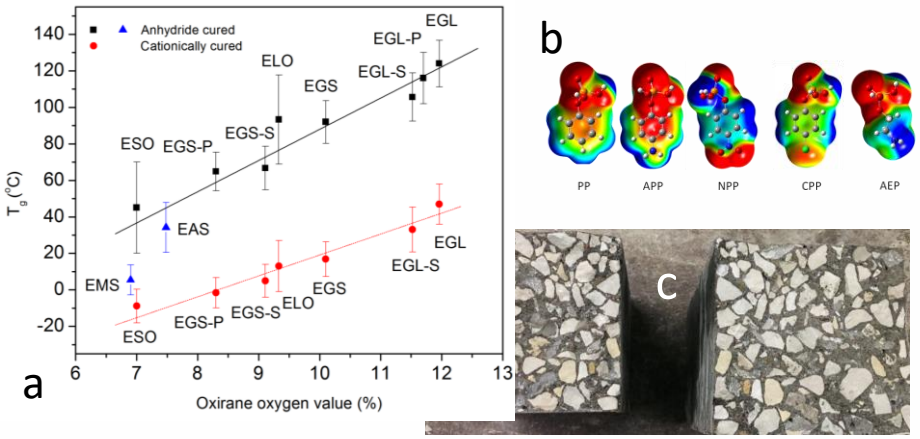
Polymer Composite Materials

Research Topics

- Polymers for sealing of geothermal well leakage
  - Develop hydrothermally resistant monomers and polymers
  - Structure-property relationships toward commercialization
- Surface modification of inorganic oxide fillers
  - Tailor filler interfaces to improve performance
  - High energy storage density low loss dielectric composites
  - Concrete: higher tensile strength, reduced ASR, 3-D print
- Enhanced oil recovery polymer gels
  - Design composite and polymerization chemistry
  - Low cost, state of the art tools for directing resource flow

Facilities

- Wet organic lab, Materials Research Center, NMR and other spectral characterizations, thermal analyses, dielectric and impedance characterizations, EOR analyses



a) Polymer glass transition as a function of soybean oil monomer oxirane conc.; b) Charge densities of ligands for dielectric composites; c) Smooth, cohesive failure mode for low ASR, higher tensile strength concrete

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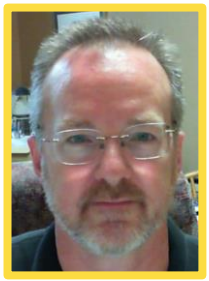

Funding Sources

- Honeywell
- Office of Naval Research (ONR); U.S. Army; Dept. of Energy (DOE)
- Industrial consortium (JIP) Enhanced oil recovery gels

Keywords

- Composites, surface modification, polymer materials design and syntheses, energy, oil recovery

Recognitions/Significant Achievements

- State of art dielectric energy storage density, low loss
- Best paper Thermoset Resin Formulators Asso. (TRFA) meeting
- Several patent applications and commercialization processes