Using Chemistry to Make and Upcycle Roofing Asphalts – Research Trends

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As an avid researcher, Jeramie enjoys chemical synthesis, catalysis, supramolecular chemistry, photochemistry, separations and purifications, carbon materials science, advanced chemical characterization, green chemistry, sustainable materials and modeling.

During his tenure at WRI, he has helped foster and lead multiple collaborations for industry-based initiatives such as the Asphalt Industry Research Consortium, the Heavy Oil Research Consortium, Processing Improvement of Problematic Crudes Consortium, and the Consortium for Production of Affordable Carbon Fibers in the United States (DOE Contract #: EE0008203). For this last initiative he was the Principal Investigator leading a diverse team consisting of Oakridge National Laboratories, Massachusetts Institute of Technology, Southern Research Institute, University of Wyoming, Solvay Composites, Koppers Inc. and Ramaco Carbon. From this work, Jeramie continues to work with multiple international companies to help them develop mesophase pitch from their various feedstocks for pitch-based carbon fiber applications.

Regarding more traditional asphalt research, Jeramie has extensive knowledge in oxidative aging (NHCRP 9-61, Fundamental Properties III Validation, and several commercial projects), relating chemical characteristic and refinery processing to asphalt performance, and diagnosing asphalt variability. For more cutting-edge advancements, he has led efforts to develop novel asphalt materials by chemically modifying coal to generate hybrid bio-based asphalt materials for the University of Wyoming School of Energy Resources. Additionally, he is passionate in developing concepts to produce bio-modified asphalt recycling agents/rejuvenators from various wastes such

as oxidized asphaltenes, reclaimed asphalt shingles, plastics, tire pyrolysis oils, wood, paper, cotton clothing, agricultural wastes and from epoxy resin composites such as those from end-of-life wind turbine blades, printed circuit boards and carbon fibers. These cutting-edge innovations and technologies were the genesis for the WRI Waste Re-engineering Initiative launched in 2022 to help the asphalt, manufacturing and agricultural industries address circular economy needs.