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Polymers from sustainable and renewable sources

Polymers have truly transformed our way of life from electronics to food packaging. Annual production of polyolefins alone is projected to grow to nearly 170 billion kg by 2018. Phenolic resins are another family of polymers and oligomers composed of a wide range of structures based on the various reaction products of phenols with formaldehyde. Applications vary from commodity construction materials to high technology applications in electronics and aerospace. Worldwide consumption of phenolic resins exceeds 10 million tons; the largest volume application is in plywood adhesives and accounts for ca. 50% of U.S. consumption. Given that both of these major polymer classes are derived from petroleum-based monomers and with increasing environmental constraints, major opportunities can be explored in research and commercialization for making high performance materials from renewable sources. Potential approaches for making polymers with outstanding durability and ease of formability to complex contours will be discussed; and how monomers that do not compete with food can be utilized and expanded. A balance to meet performance, sustainability, and biodegradability must be considered.

Biography

Abu-Omar completed his PhD from Iowa State University and postdoc from Caltech. He is the R. B. Wetherill Professor of Chemistry at Purdue University, and the associate director of the Center for Catalytic Conversion of Biomass to Biofuels (C3Bio), an Energy Frontiers Research Center. Mahdi is the Founder and President of Spero Energy, Inc., a green specialty chemicals company and a technology provider for the manufacture of high value renewable chemicals from biomass. He has published more than 100 original research papers in peer-reviewed journals. Dr. Abu-Omar is a Fellow of the American Association for Advancement of Science (AAAS).

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