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Renewable raw materials for phenolic resins

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Abstract

About 6 million tons of phenolic resins are produced annually worldwide. The attractive resin properties such as excellent dimensional stability to 150ºC, excellent chemical and moisture resistance, outstanding fire/smoke/toxicity (FST), and very favorable economics are the contributing factors that have maintained the large volume consumption of phenolic resins. Furthermore these resins can be transformed into a variety of important modified materials such as epoxies, benzoxazines, and cyanate esters. For many decades selected bio-based raw materials have been used in phenolic resins and these include: cashew, tannin, lignin, furfural, linseed oil, tung oil, others. With the continuing cost escalation of crude oil with prices exceeding $140/ barrel, renewable sources of phenolic raw material components are desirable. Phenol, the major component of phenolic resins, is derived mainly from petrochemical source – cumene oxidation. Many government, academic, and industrial sponsored programs have been successful in transforming biomass materials into ethanol and biodiesel for transportation fuels. A new biomass process known as BBB and developed by CIMV, to be discussed during this conference by Professor Michel Delmas, provides lignin, known as Biolignin™, in high purity and reproducibility. Biolignin™ can be transformed into resoles and novolaks. The conditions and resin characteristics of Biolignin™ modified phenolic resins and selected transformations will be discussed during the presentation.

Biography

Dr. Louis Pilato is a member of the Society of Advancement of Material and Process Engineering (SAMPE). He was installed as a Fellow of the Society in 2001. He is also a member of the American Chemical Society. Dr. Pilato consults in a variety of Chemical and Materials Science disciplines such as Resin Matrix Systems, Phenolic Resin Technology, and Nanotechnology. He has presented many SAMPE tutorials related to Nanotechnology and Resin Matrix Systems. He is the author of 4 books. The most recent book is titled, “Phenolic Resins: A Century of Progress.” It was published in May, 2010.