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Renewable resource-based resin synthesized from low-molecular weight lignin

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Epoxy resin is one of the most important thermosetting materials and it is used for electronic materials due to its superior physicochemical characteristics ranging from extreme flexibility to high strength, good heat resistance, and high electrical resistance. The most commercially available epoxy resin comes from the synthesis of bisphenol A with epichlorohydrin, which represents 90% of the epoxy precursor in the world. However, bisphenol A is an environmental hormone that mimics human estrogen, and can therefore cause impotency as well as cancer. This makes bisphenol A undesirable as a raw material for epoxy resin synthesis. The increasing global energy requirement as well as greater environmental awareness also leads to bisphenol A being considered a less desirable material because it is derived from a fossil resource. Hence, there is an urgent need to investigate a renewable resource-based substitute for bisphenol A for the synthesis of epoxy resin. Organosolv low-molecular weight lignin extracted from steam-exploded woody biomass was used as a raw material of epoxy resin. The lignin epoxy resin was cured with the low-molecular weight lignin as a natural curing agent. The thermal decomposition temperature of cured lignin-based resin was lower than that of cured bisphenol A-based resin. However, it satisfied thermal and mechanical properties required for electronic circuit board. Hence, this high renewable resource-based content resin (more than 80% lignin content) derived from woody biomass may be a desirable candidate in the field of electronic materials.

Biography

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