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Effect of epoxidized cardanol on poly (vinyl chloride) as secondary plasticizer

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An epoxidized cardanol plasticizer derived from cardanol was synthesized and characterized by Fourier transform infrared (FTIR), 1H nuclear magnetic resonance (^{1}H-NMR) and ^{13}C nuclear magnetic resonance (^{13}C-NMR). Effects of the epoxidized cardanol used as secondary plasticizer for dioctyl phthalate (DOP) in PVC blends were studied. Dynamic mechanical analysis (DMA), tensile test and thermogravimetric analysis (TGA) of PVC films plasticized with different content of epoxidized cardanol were investigated. The results indicated that the percent elongation increases with increasing epoxidized cardanol content. The epoxidized cardanol had better thermal stability than cardanol, the 10% weight loss (T_{10}) and 50% weight loss (T_{50}) of which enhanced from 218.73 to 259.53°C and 248.50 to 312.53°C and the plasticized films showed the thermal stability increased with increasing the content of epoxidized cardanol. When 8 phr DOP was replaced with epoxidized cardanol, the T_{10} and T_{50} increased by 9.58°C and 5.53°C respectively. The properties of volatility and extraction resistance of plasticizers were tested and showed similar or higher stability in those properties than that of DOP. Surface characterization of films by FTIR was also investigated.

Recent Publications

1. Jie C and Ke L (2018) Synthesis of Tung-oil-based triglycidyl ester plasticizer and its effects on poly (vinyl chloride) soft films. ACS Sustainable Chemistry & Engineering 6:642–651.
2. Jie C (2018) Synthesis and application of a novel environmental $C_2$6 diglycidyl ester plasticizer based on castor oil for poly (vinyl chloride). Journal of Materials Science 53(12):8909-8920.
3. Jie C and Ke L (2016) Synthesis and application of a novel environmental plasticizer based on cardanol for poly (vinyl chloride). Journal of the Taiwan Institute of Chemical Engineers 65:488-497.
4. Jie C (2016) Thermal behavior of epoxidized cardanol diethyl phosphate as novel renewable plasticizer for poly (vinyl chloride). Polymer Degradation and Stability 126:58-64.
5. Jie C (2015) A Novel Bio based Plasticizer of Epoxidized Cardanol Glycidyl Ether: synthesis and application in Soft Poly (vinyl chloride) Films. RSC Advances 5(69):56171-56180.

Biography

Jie Chen has completed her PhD at Beijing Forestry University. She has published more than 30 papers in reputed journals.

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