Effect of the addition of lignin on thermal properties of an epoxy adhesive

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Among natural polymers, lignin represents an enormous renewable raw material source: only cellulose is more abundant than lignin [1]. Its obtention is related to the manufacture of cellulose pulp for paper and some chemical derivatives. In this process, industrial lignins are obtained as co-products, but most of them are used as internal fuel in the process and only a small amount is actually recovered for being used as a chemical product [2]. On the other hand, epoxy resin is one of the most commonly used thermoset materials. It presents good thermal and mechanical properties and it is widely used in lot of applications in different industries. They are also used as coating, high performance adhesives, and composites, which show their high versatility. However, around 90 % of commercially available epoxy resins use bisphenol A as precursor, which has been reported to be an environmental hormone due to its estrogenic activity [3]. Furthermore, bisphenol A is derived from a fossil fuel. Therefore, there is an increasing interest in finding an alternative to this product. In this work, up to 50 % of lignin is added to epoxy resin in order to reduce the amount of epoxy and, therefore, the bisphenol A. The effect of lignin on glass transition temperature, curing kinetics and thermal conductivity by means of DSC are explored.

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