Tannic Acid as a Functional Crosslinker in Polymer Systems

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Current epoxy crosslinkers are amine-based, which are not environmentally friendly. Upon epoxy degradation, the chemicals leech out into the environment. Tannic acid is a well-known, naturally occurring polyphenolic compound used in antioxidants and chelating agents. The study of tannic acid's use in a wide variety of polymer systems as a flame retardant additive is extensive; however, its use as a hardener/cross-linker in epoxy lacks research.

Researchers at Purdue University have developed a thermosetting polymeric composition by crosslinking epoxy by using tannic acid as the hardener. Tannic acid is a more sustainable crosslinker, has less environmental impact, and is inexpensive given it is a byproduct from the papermaking process. This composition has a high glass transition temperature and extended pot-life. This composition also allows for tannic acid's use as functional system to prepare formulations with other properties such as fire retardancy.

Advantages:
-Environmentally friendly
-Inexpensive
-High glass transition temperature

Potential Applications:
-High performance epoxy
-Flame retardant

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