# Tannic Acid as a Functional Crosslinker in Polymer Systems

**An environmentally friendly and inexpensive thermosetting polymeric composition utilizes tannic acid as a sustainable hardener for high-performance epoxy applications, including fire retardancy.**

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

**TRL:** 3

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