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References:

Parit, et al. ACS Omega, 2018
[Doi:10.1021/
acsomega.8b01345](https://doi.org/10.1021/acsomega.8b01345)

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Reference: Transparent UV
Protection Film

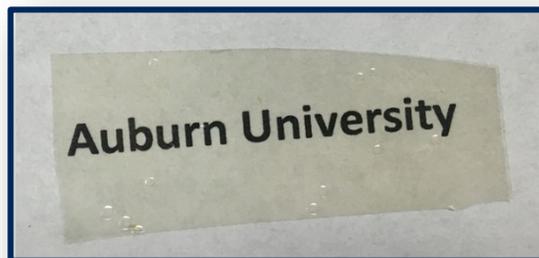


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Renewable, Transparent UV Protection Film

Auburn University is seeking a licensee or development partner for a novel transparent film developed from cellulose nanocrystals and lignin.

Overview: The desire to create more renewable and biodegradable alternatives to petroleum-based polymers has grown in recent years. Biomass-derived materials may help meet these needs. Cellulose nanocrystals have shown great promise due to the abundance of cellulose and the beneficial properties resulting from their nanoscale structure. Similarly, lignin is an abundant renewable carbon source, but it is commonly discarded as a waste product. Lignin is a natural UV blocker, and can be combined with cellulose to create a transparent, homogenous UV-blocking film.



A sample film with 85% transparency.

Advantages:

- **ABUNDANT MATERIALS** - Cellulose and lignin are both widely available materials. Cellulose is the most common organic polymer and can be produced from a variety of plants. Lignin is also very common and is a byproduct of papermaking.
- **ENVIRONMENTALLY FRIENDLY** - Cellulose and lignin are both naturally occurring products and are readily biodegradable after use.
- **UV BLOCKING** - Lignin is a natural blocker of ultraviolet light. Its presence in this film allows the compound to provide UV protection while maintaining transparency.
- **HOMOGENEOUS** - The films produced by this method have been shown to have uniform properties throughout the entire material.

Description: Transparent films have a wide array of uses in modern industry, but most are made using petroleum products. To counter the limited petroleum supply and minimize the environmental impact, there has been an increased focus in creating viable biomass-derived materials with desirable properties.

Cellulose is an abundant biomass product that has been utilized extensively in applications such as paper or cellophane. Lignin is a naturally occurring polymer which is frequently discarded as a waste byproduct of paper making. The inherent properties of lignin, however, are useful as a UV-blocker. Cellulose and lignin have often shown incompatibility; however, this innovation has developed a strategy for overcoming this hurdle. By controlling the aqueous solvent during fabrication, these two components can be combined to create a transparent, homogeneous polymer capable of blocking UV light.

Status:

- Subject of US Patent [10,829,602](#), US continuation ([20210017345](#)), and Canadian application
- Technology has been demonstrated on a laboratory scale
- This technology is available for exclusive or non-exclusive licensing

