

Process for Preparing Conductive Cellulose and Cotton Using Ionic Liquids

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Process for Preparing Conductive Cellulose and Cotton Using Ionic Liquids

- Novel process fabricating nanostructure conductive polypyrrolecellulose fiber composites using Ionic Liquid (IL) solvent
- IL acts as a solvent for the polymerization of pyrrole and can dissolve as cellulose
 - Combination of both properties lead to effectively impregnate cellulose fibers as well as effectively polymerize pyrrole
 - Resulting in electrically conductive cellulose fiber composites

Advantages of Process for Preparing Conductive Cellulose and Cotton Using Ionic Liquids

- Enhancement
 - Mechanical and conductive properties
- Fe(III) absorption peaks at 65mg/g around 10 minutes
 - Indications of significant improvement compared to other processing routes
- Increased amounts of nanostructure polypyrrole particles
- Resistance of conductive cellulose fiber composite reduced significantly with increased pyrrole concentration
- Degradation of strength and stiffness

Figure 1. Structure of Polypyrrole (PPy)

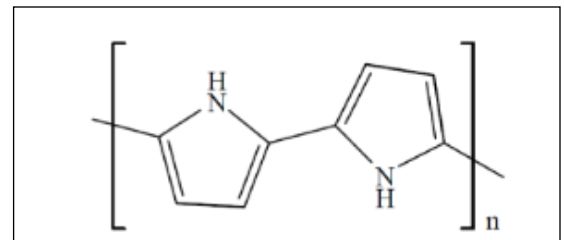


Table 1. Results of the Resistance at of PPy/Cotton thread*

Pyrrole Concentration	0.1 %	5 %
Resistance (kΩ) @ 1 cm	1518	2.99

* Experimental conditions: fibers immersed for 15 minutes at 22 °C in 1:1 molar ratio Emim[FeCl₄], polymerization time = 24 hours.



Figure 2. Photos demonstrating electrical properties of PPy-coated Gütermann cotton thread.

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