

Fabrication of cellulose single filaments

High-strength cellulose filament fabricated from cellulose nanofibrils

Overview

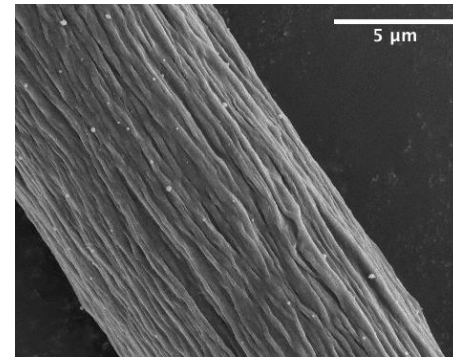
Cellulose nanofibrils (CNFs) are highly crystalline nanofibers obtained from wood pulp. CNFs are environmentally compatible new materials with excellent mechanical properties such as light weight, high strength, and low thermal expansion. Because of these outstanding mechanical characteristics, CNFs are expected to be applied to automotive components, electronic devices, gas barrier materials, and medical materials. On the other hand, chemical fibers made of cellulose, known as rayon, are also used in clothing and tire materials as regenerated fibers made from wood pulp and cotton cellulose. Regenerated fibers using CNF as a raw material have been researched and developed, however the mechanical properties of the fabricated single cellulose filaments have not been sufficient. By developing an innovated CNF orientation control method using flow and electric fields, we have successfully fabricated high-strength cellulose single filament.

Product Application

- Textile woven with monofilaments
- Tire materials (carcass cord)
- Filter materials
- Moisture sensor

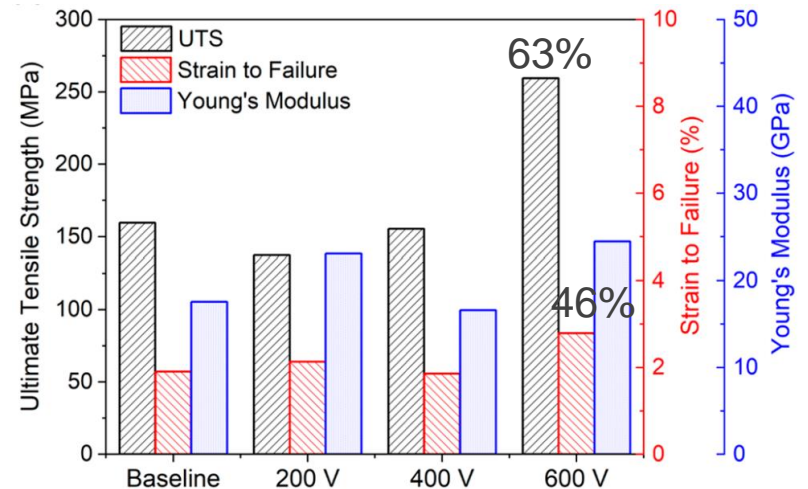
IP Data

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SEM image

Mechanical properties of cellulose filament



Related Works

- [1] S. Fukumori, H. Takana, Japanese J. Multiphase Flow, Vol. 35, No. 1, pp. 134-141, (2021).
- [2] H. Wise, H. Takana, F. Ohuchi, and A.B. Dichiara, ACS Applied Materials & Interfaces, Vol. 12, pp. 28568-28575 (2020).
- [3] H. Takana and M. Guo, Nanotechnology, Vol. 31, 205602 (2020).
- [4] H. Wise, H. Takana, and A.B. Dichiara, ACS Applied Materials and Interfaces, Vol. 15, pp. 36647-36656 (2023).

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