

## iCom – sustainable fibers with ionic liquid

Due to population growth and prosperity increasing, the demand of textile fibers also increases, however, the arable land and water for cotton cultivation is limited. To top that, many other popular textiles, such as polyester, are made out of crude oil. Therefore, before the world runs out of natural resources, researchers from Aalto University and the University of Helsinki have come up with a more sustainable way to produce textiles called **Ioncell**.

As shown in Figure 1, Ioncell is a technology that turns used textiles, pulp or even old newspapers and cardboard into high-quality man-made cellulosic fibres (MMCF) for textiles and technical applications by dissolving cellulose with ionic-liquid (IL) solvent.

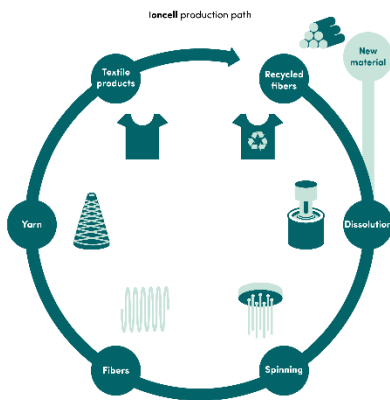


Figure 1. Ioncell production path (<http://ioncell.fi/>)

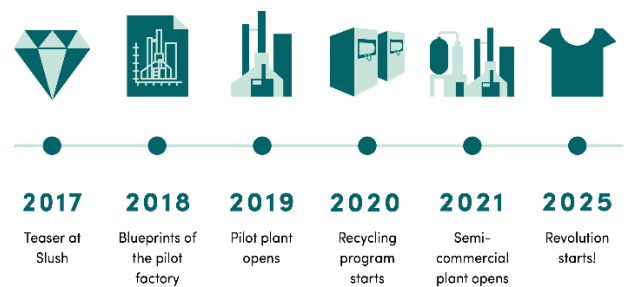


Figure 2. Schedule of Ioncell (<http://ioncell.fi/>)

### Objectives

Based on the schedule of Ioncell project (

Figure 2), the target at this stage is to design and build a pilot plant which includes cellulose pretreatment, preparation of the cellulose solution (dope), dope filtration, spinning, washing, finishing, drying the staple fibre product, and purification and recycling of the solvent (IL). The outcomes will be:

- Technology package that contains basic Ioncell-F process data, pilot plant design, investment cost and operating instructions
- Preliminary design package of a commercial scale Ioncell-F plant.

The iCom project will create a commercialization strategy to provide tools for efficient penetration of Ioncell-F fibers into the existing markets and for establishing new long-term markets in growing and high value-added areas. The target for the commercialization is to get deeper insight of the potential clients and their needs, and to create a valid business concept/model for marketing and production of high-quality Ioncell-F fiber in a sustainable and feasible manner.

Researchers: Yao Xiao, Esko Tirronen

**Project-related publications:**

Nguyen, P. (2019) Purification of aqueous, protic ionic liquid by distillation, M.Sc. thesis, Aalto University. On-going.

Xiao, Y. Oinas, P. (2019) Conceptual plant design for environmentally friendly ionic liquid based cellulosic textile fibers, 14<sup>th</sup> SDEWES Conf., Dubrovnik, 1-6.10.2019.