

Cellulose Nanocrystals (CNCs)

Bio-building blocks for tomorrow's materials

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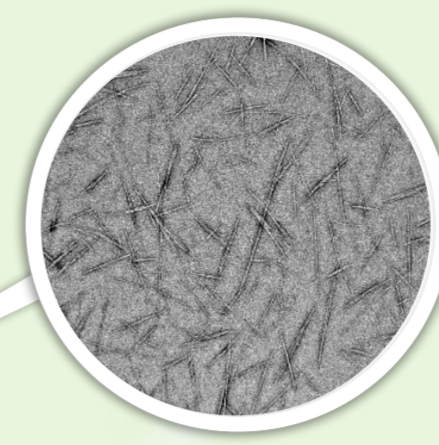
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Overview

- Melodea Ltd. Is a pioneer in the development of a sustainable and economically viable industrial process for the production of CNC from wood pulp and side streams of the pulp and paper industry. Melodea is also developing CNC applications such as gas and oil barrier coatings, anti-friction coatings, anti-bacterial coatings, foams and additives to different polymer systems and paper products.
- In recent years we have increased production of our products in an industrial pilot facility in Israel. Melodea has also developed a proprietary Sulfuric Acid Recovery Procedure which enables the recovery of sulfuric acid used in production of CNC.
- Our investors are Holmen pulp and paper from Sweden, and Klabin from Brazil.



What is CNC ?



- Natural building blocks of all plants on earth
- Excellent for production of novel eco-friendly materials

Material	Tensile strength (GPa)	Young's modulus (GPa)
CNC	7.5	145
Steel	4.1	207
Kevlar	3.8	130
Glass fiber	4.8	86

Kim, et al. International Journal of Precision Engineering and Manufacturing-Green Technology 2015

CNC production

- Efficient and sustainable extraction of CNC from cellulose based material



Cellulose raw materials; wood pulp, paper waste, flax, cotton and more



Chemical processing



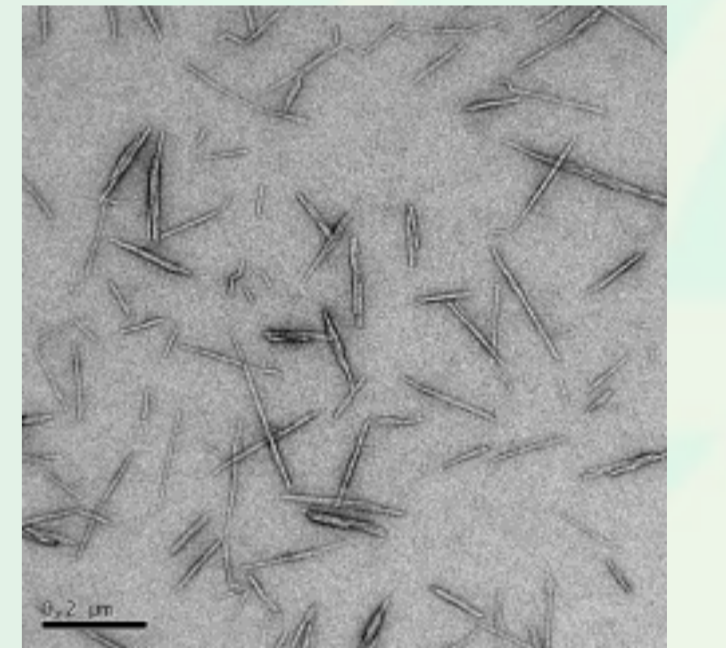
CNC product → applications



- Simple proprietary production process
- Low CAPEX, chemical recovery
- Easily integrated into an existing facility

- Melodea's CNC suspension

- Transparent suspension of nano particles in water
- Dimensions: 5-20 nm diameter, 100-400 nm length



- First CNC pilot in Europe with capacity of 35 tons/annum, is being commissioned in Örnsköldsvik, Sweden.
- Pilot scale CNC production capabilities in Israel.
- Building a flag ship plant in a partnership in Israel that can produce up to 200 tons per year.

The need

Novel materials with superior performance made from renewable resources as an alternative to fossil oil based materials

Superior advantages of the new materials:

- High technical performance
- Competitive cost
- Renewable resources
- Sustainable production
- Improved health and safety



Main applications



Paints and coatings

- Novel CNC based wood coatings
- Scratch and abrasion resistance
- Rheology improvement



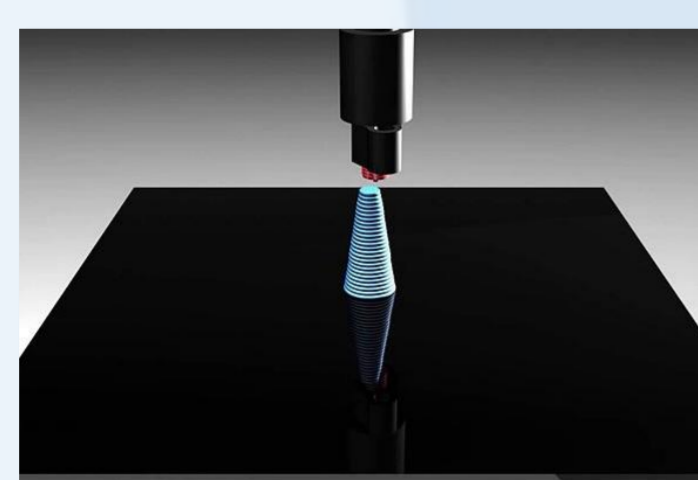
Barrier coatings for advanced packaging

- Innovative barrier for oxygen, oils and more
- Recyclable, compostable, degradable
- Applications on paper and plastics

Additional applications



Fibers and textile



3-D printing



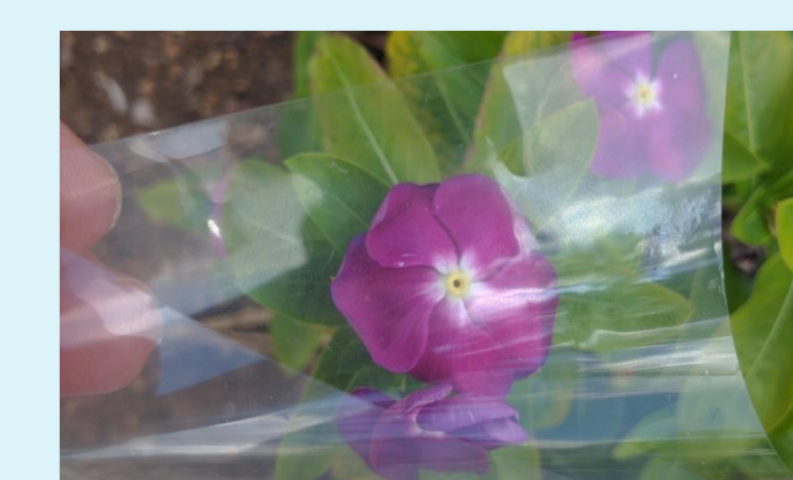
Hydrophobic CNC



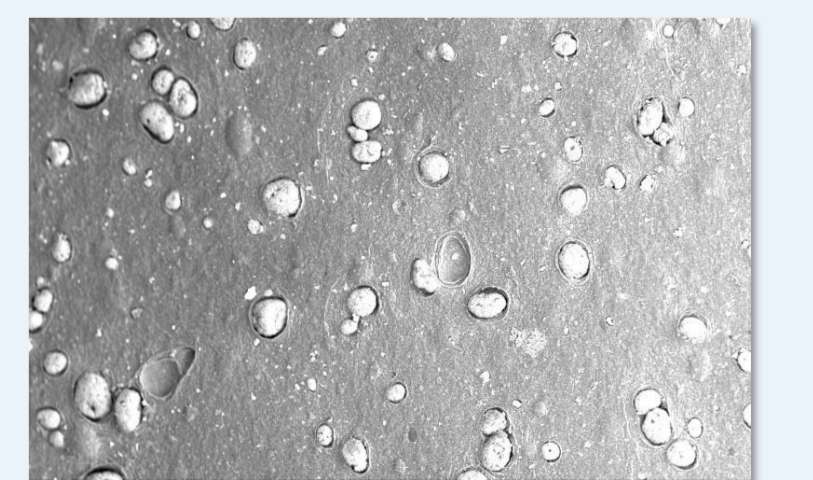
Oil and gas rheology modifiers



Cement and concrete strength and rheology additives



Transparent flexible films



Antibacterial coatings

What we are looking for

- Joint Development Agreement (JDA) with strategic partners
- Clear product vision
- CNC based commercial products in the markets in two to three years time
- Technology licensing
- Capital investments

International projects

