

THE NEW COLOUR OF COLOUR

Cellulose Nanocrystals

BY DEVOTING MAJOR EFFORTS TO CUTTING-EDGE RESEARCH ON CELLULOSE NANOCRYSTALS, FPINNOVATIONS IS OPENING UP COLOURFUL OUTLETS FOR INNOVATIVE FIRMS.

Resulting from several years of research, cellulose nanocrystals is a nanomaterial extracted from wood fibre. Wood fibres from Canada's vast forests can be transformed into a high-value nanomaterial, which will be used to manufacture a wide range of perfected products that are totally unique.

Cellulose nanocrystals has the potential to generate a new bioeconomy based on innovative, high environmental value approaches. It will allow creation of new products, while adding value to existing products. Cellulose nanocrystals can economically be extracted from trees. Its properties and many potential forms allow many uses, including:

- Iridescent or magnetic films
- Pigments, inks and cosmetics
- Manufacturing of improved construction products
- Recyclable interior and structural components for the transportation industry
- Innovative coatings and new fillers for papermaking
- Innovative bioplastics
- Reinforced composites
- Films for optical switching
- Biocomposites for bone replacement
- Paint additives
- Electrically conductive membranes
- Electronic paper printers
- Encapsulated quantum dots for crystalline semiconductors
- Perfected or "intelligent" packaging materials



These nanomaterials and their byproducts will be used in many industrial sectors, particularly:

- Aerospace
- Automobile
- Medical devices
- Chemicals
- Composites
- Cosmetics
- Pharmaceuticals
- Coatings
- Forest products

One of the most spectacular attributes of this material is that it allows the creation of flexible films that are easy to manipulate. The iridescent capabilities and colours of these films can be adjusted precisely, making it possible to revolutionize many applications: security papers, iridescent pigments, switchable optical filters and barriers, sunscreens, cosmetics, packaging, coatings... This is really the new colour of colour.

The use of cellulose nanocrystals also improves strength and solidity and reduces the damage caused by wear, humidity and UV rays. Taking advantage of its unique properties, such as colour, antimicrobial activity and selfcleaning, it is possible to create a multitude of new forest nanoproducts.

Cellulose nanocrystals is abundant, renewable, recyclable and not damaging to the environment. It is expected to represent a dominant force in economic growth in the coming decades, and should serve as a strategic platform for sustainable development.

As a Canadian leader in cellulose nanocrystals research, FPIinnovations is a member of ArboraNano – the Canadian Forest NanoProducts Network –, which brings together expertise from the forest and nanotechnology sectors.

Researchers and engineers from these industries, as well as universities and government laboratories, are part of the ArboraNano network. Fundamental research, applied research and private sector innovation thus are combined to take advantage of the vast sustainable natural resources of Canadian forests.