TOYAMA Nanotechnology-connect Core Competence Area

TOYAMA Nanotechnology Manufacturing Cluster

TOYAMA Nanotechnology-connect Promotion Council

Toyama Prefecture

Toyama New Industry Organization
Connecting “Nanotechnology” and “Manufacturing”
An Innovation Centered Around the Technologies of Global Niche Top Companies

Toyama prefecture is where a wide range of manufacturing companies of machinery, metal, chemicals, or electronic parts are clustered with companies having high global market share in specific technological areas. The “Manufacturing Industry Strategy for the Future of Toyama Prefecture” was developed based upon such regional characteristics in order to develop the globally competitive manufacturing industry of the next generation by connecting manufacturing technologies accumulated in the region over time and niche top technologies related to nanometer order-level processing or material manufacturing.

In July 2014, Toyama Nanotechnology Manufacturing Cluster (Toyama Nanotechnology-connect & Next Generation Manufacturing Creation Program) was selected as one of the schemes of “Regional Innovation Strategy Support Program” by the Japanese Ministry of Education, Culture, Sports, Science and Technologies. In this scheme, we will be working on the R&D for the application of nanofiber to wide range of industries starting from fibers, resins, electronics, healthcare, to tissue engineering based upon the industrial manufacturing technology of cellulose nanofiber. It is also our aim to create an environment in which innovations will be continuously created in our region by comprehensive promotion of formation of industry-academic-government networks for industrialization of new technology and human resource development to support such innovations.
Establishment of knowledge networks of universities and other institutions

Regional collaboration coordinators who will scout for technological needs at universities or research institutes, collect and organize information of technological needs, conduct researches of company needs, and make matches with such needs will be assigned in order to build a network for industrialization of the R&D results.

Further, a wide network of nanotechnology will be established in order to foster awareness of nanotechnology-driven manufacturing in the region and to promote the establishment of research and commercialization groups of new category through exchange among members.

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Establishment of Regional Innovation Strategies

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Companies and Financial Institutions

Local Universities, etc.

Toyama University
Toyama Prefectural University
National Institute of Technology, Toyama College
Toyama Industrial Technology Center
TOYAMA MONOZUKURI Research and Development Center

Toyama Prefectural Machinery and Electric Industries Association
Toyama Prefectural Plastic Industries Association
Toyama Aluminum Industrial Association
Textile and Fashion Toyama Association
Toyama Pharmaceutical Association

The Hokuriku Bank
First Bank of Toyama
Bank of Toyama
Toyama Shinokin Bank
Takaoka Shinokin Bank

Sharing of research facilities and equipment

The state-of-art research facilities and equipment relative to nanotechnologies are being introduced at Toyama Industrial Technology Center and TOYAMA MONOZUKURI Research and Development Center.

In addition, technological support staff is assigned so that the research facilities and equipment in place can be readily utilized based upon user needs in order to accelerate, vitalize, and advance regional research and development activities.

Development and implementation of human resource development programs

In order to realize regional innovation strategies, it is essential to develop human resource which can promote manufacturing utilizing nanotechnology, succeed in the region, and create local-based new products or projects. We will collaborate with local universities and institutions to develop and implement human resource development programs.

Characteristics to be developed
Human resource or market development with entrepreneurship
Human resource or research and development with innovative mind
Human resource or technological development with growth orientation

Establishment of sustainable innovation creation system
Concentration of Researchers Who Play Core Roles in Regional Innovation Strategies

Advancement of micronization technology
Satoshi Iwatsubo
Toyama Industrial Technology Center

Under the current micronization technology, particles of several dozen nm diameter or less show strong condensation, making the particles of that size level impossible for manufacturing. A significant material performance improvement for battery materials or development of drugs with higher efficacy on the affected part are expected by solving this problem. To this effect, this research aims to establish a technology of monodisperse particle and improve nanofiber micronization technology in order to fabricate biomass nanofiber with superior dispersion.

Development of skin care base material
Satoshi Iwatsubo
Toyama Industrial Technology Center

Nanofiber, being able to form very thin membrane with network structure, can be a skin care base material having high concentration drug carry with less stress and more comfort to the skin. This theme is aimed at developing new skin care products using biomass nanofiber such as cellulose, chitin or chitosan based on the nanofiber technology to be derived from the theme as described above.

Development of high performance pharmaceutical material
Ryoji Kanamaru
Toyama Industrial Technology Center

The non-woven fabric fabricated by electrospinning device is ultrathin and has such contradicting properties as water proofness, breathability and moisture permeability while it lacks strength to be applied in various use. By improving naturally derived cellulose nanofiber featuring higher strength, this research aims to develop a material with augmented strength to be applied to various pharmaceutical materials while maintaining the features of nanofiber.

Development of biocompatible material support nanofiber
Makoto Nakamura
Toyama University

Nanofibers and nanofibers are the materials that can be potentially applied to clinical, biological, or pharmaceutical purposes. This research is aimed at the "development of biocompatible material support nanofiber". This research aims to add organ derived material and organ activating function to Toyama's original nanotextile, connect such technology with 3D fabrication technology, various printing technologies or microwave processing technologies for the development of useful substrates or tools for cell culture or tissue engineering or the application to the next generation pharmaceutical manufacturing.

Development of high strength and high thermal conductivity resin by hybridization of cellulose nanofiber and nanoparticle
Kazuki Sanada
Toyama Prefectural University

By utilizing the dispersion and inner structure designing technologies accumulated in the carbon nanotube field, this research aims to develop a new resin having hybrid inner structure of cellulose nanofiber and nanoparticle featuring high strength compatible with high thermal conductivity for the industrialization of high performance resin composite for molding and shaping material for 3D printers.

Development of a mold material for gas permeating nanofiber spinning and micro processing technology
Satoshi Takei
Toyama Prefectural university

This research is aimed at developing mold for nanofiber spinning made of nanofiber compound resin featuring high productivity and good transferability essential to the manufacturing of special function film applicable to bioscape or pharmaceutical tapes and microfiber spinning process using this developed mold. It is also aimed to commercialize nanofiber spinning technology and special function film developed through the industry-academia-government collaboration effort with related local companies.