

## **Nanotechnology based business tripled in Finland since 2008**

*Nanotechnology business, which produces commercial products and services based on nanotechnology, is growing strongly in Finland. According to recent statistics, there are now at least 210 nanobusiness companies in Finland, while in 2008 the number was 65. The figures were published in an international coating seminar in Mikkeli, Finland, last week. The opening of a new SaimaFlex R&D centre, with focus on coating of flexible surfaces, was also published in the seminar.*

## **Strong potential in coatings, growth expected in end products**

The number of companies selling products based on nanotechnology has more than tripled in three years. The emphasis of the field has drifted away from the nanomaterials, and the number of companies offering services has grown the most, said Eeva Viinikka, Programme Director of Finnish Nanotechnology Cluster Programme, in MIICS-seminar in Mikkeli. In future, growth is expected especially in nanotechnology based end products that make use of ultra light coatings to improve their characteristics. New technologies of this field, such as atomic layer deposition (ALD) and the method of roll-to-roll processing, have brought commercial opportunities for products based on nanocoatings.

## **Coatings can reduce friction and energy consumption in machines**

Machine building is an important field of industry using coating technology and nanocoatings. The ultra thin coatings may be used to control wear and friction in different machines and equipment. The reduction of friction has a significant impact on the energy consumption and thus the environmental effect of machines. Professor Kenneth Holmberg from VTT<sup>i</sup> displayed at MIICS some results of a recent research, carried out as a part of Fimecc's<sup>ii</sup> DEMAPP programme<sup>iii</sup>, which showed that innovative coatings may reduce the fuel consumption in passenger cars by 18 %, on average. Programme Director Markku Heino from Spinverse gave an introduction to application-driven coating development carried out at Fimecc, with focus on friction control and demanding industrial environments with intense wearing, corrosive circumstances and high temperatures.

## **Innovative coatings improve collection of solar radiation**

Solar energy is another important field of application of nanocoatings given that efficient collecting of solar radiation requires innovative coating technology. Choosing the right coating according to the circumstances maximizes absorption of radiation and minimizes emissivity of the system. Savo-Solar Ltd from Mikkeli, Finland presented at MIICS their innovative MEMO coating that enables reaching excellent values of absorption and emissivity in solar applications.

## **Intelligent printed products, packages and textiles enabled by coatings**

Ultra thin coatings bring a wide array of possibilities also to printed electronics, packaging and textile industry. The applications in printed electronics include for example diagnostics and functional packages, such as food packages using sensors to detect degradation. Food packages also make use of coatings to substitute aluminium foil as a barrier of moisture, grease, oxygen and aromas. In textiles, coatings are used for improving resistance to fire or weather conditions, for example. New textile applications include smart antimicrobial dressings for wounds, as well as self-

healing fabrics. Thus, new coating methods suitable for industrial manufacturing and flexible materials must be developed along-side with new coatings.

The Finnish companies and research centres have strong and versatile knowledge in coatings, both for demanding applications in metal industry as well as for new ultra thin coatings for applications in solar energy or printed electronics. Coatings have been an important area of emphasis in the Tekes's<sup>iv</sup> programme of functional materials. MIICS gave an excellent overview of the current issues, challenges and operators of this field, said Sisko Sipilä, Leading Expert at Tekes.

### **SaimaFlex to develop coatings of flexible surfaces in Mikkeli**

Mikkeli area has an important role in the research of coating technology in close cooperation with the companies of the field. SaimaFlex, a research centre to be opened in Mikkeli annexed to the ASTRaL coating laboratory of the Lappeenranta University of Technology in summer 2012, is a good example of cooperation between academic research and industry. SaimaFlex's ALD research group will develop coatings and processes of flexible surfaces for industrial applications. SaimaFlex aims to be the global leading ALD centre on flexible surfaces by 2016.

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*Mikkeli International Industrial Coating Seminar 2012 brought together the leading experts on coating technology to Mikkeli, Finland for the sixth time. The seminar was organized by Miktech Ltd./ Nanotechnology Cluster Programme, Lappeenranta University of Technology, Savo-Solar Ltd and Mikkeli University of Applied Sciences. The seminar was enabled by the European Social Fund.*

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<sup>i</sup> VTT Technical Research Centre of Finland

<sup>ii</sup> Fimecc Finnish Metals and Engineering Competence Cluster

<sup>iii</sup> DEMAPP Demanding Applications programme

<sup>iv</sup> Tekes the Finnish Funding Agency for Technology and Innovations

