



2008 European Frost & Sullivan Award for Excellence in Research
Award Recipient: Bioni CS GmbH & Fraunhofer Institute for Chemical Technology



“Partnering with clients to create innovative growth strategies”

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Award Description

Frost & Sullivan's Excellence in Research Award is bestowed upon the company that has carried out new disruptive research and has, in general, a strong commitment to research and development. This Award recognizes a company's research and development program that has or is expected to bring significant contributions to the industry in terms of adoption, change, and competitive posture. The fruits of this research may already have or will potentially impact certain market sectors. The Award also recognizes the overall research excellence of a company as well as its commitment towards differentiating itself based on science-backed services or solutions.

Research Methodology

To choose the Award recipient, Frost & Sullivan's analyst team tracks research and innovation in key hi-tech markets. The selection process includes primary participant interviews and extensive primary and secondary research via the bottom-up approach. The analyst team shortlists candidates on the basis of a set of qualitative and quantitative measurements. The analyst also considers the pace of research and technology innovation and the significance or potential relevance of the research to the overall industry. The ultimate Award recipient is chosen after a thorough evaluation of this research.

Measurement Criteria

In addition of the methodology described above, there are specific criteria used to determine the final rankings. The recipient of this Award has excelled based on one or more of the following criteria:

- Number or type of research projects
- Significance of research in the industry, and across industries (if applicable)
- Absolute R&D expenditures (versus industry norm) and percent growth (if applicable)
- Caliber/reputation of research staff
- Potential of products of research to become industry standard(s)
- Breadth of intellectual property ownership (patents, scientific publications, papers in peer reviewed journals, etc)



The 2008 Frost & Sullivan European Excellence in Research Award in the field of anti-microbial nanocoatings goes to Bioni CS GmbH and the Fraunhofer Institute for Chemical Technology, both based out of Germany, for their joint research efforts that have led to the development of a non-toxic for humans coating based on nanotechnology—Bioni Hygienic®. This antimicrobial nanocoating not only permanently prevents the formation of mold on walls, but also serves to reduce germs that are resistant to antibiotics in hospitals.

Micro-organisms such as fungi and bacteria appear as molds on the wall and this may lead to respiratory disorders and allergies. Particularly in hospital environment there exists a need to address this problem. Conventionally used coatings in hospitals such as anti-mold and anti-mildew coatings have a number of drawbacks. They have a very short life span and are harmful to the occupants and also to the environment. Although these coatings provide short-term solutions, the industry has now turned to nanocoatings to increase the hygiene levels in hospitals.

To address the need for such antimicrobial nanocoatings, Bioni has collaborated with the Fraunhofer Institute for Chemical Technology to develop intelligent coatings that have been modified with silver nanoparticles (about 13 nm average diameter) to offer a more long-term solution against bacteria and germs without contaminating the air inside the building. Bioni Hygenic coatings are environmentally friendly, resistant to disinfectants, acid and solvents, permeable to water vapor, are nonflammable, possess excellent washability, have very good flow, are almost odorless and come in a wide range of colors.

The usage of nanotechnology concepts posed huge challenges such as the manufacture of nanosized particles and to keep the particle size in the nano range by preventing agglomeration. The Fraunhofer and Bioni researchers were able to address these problems by stabilizing the nanoparticles with additives and quickly integrating them in a polymer system. The polymer system also serves to facilitate a homogeneous distribution of the nanosilver particles. Further, by trapping the nanosilver particles in a polymer matrix, the researchers have managed to ensure nanosafety. The TÜV Produkt und Umwelt, a test and evaluation institute based in Cologne, Germany, has awarded Bioni coatings the "TÜV Rheinland Signet" for emission-free paints and coatings. The awarded signet confirms that these coatings are nontoxic and will not cause cancer, deformities or mutations. Other key benefits of the nanosilver concept are that it has been able to exhibit good antimicrobial, antiviral and antiallergic performance while avoiding human-toxic components.

Vis-à-vis conventional coatings that employ volatile biocides, the anti-microbiological efficacy of the Bioni Hygenic coating is permanent since the nano formula developed by the researchers consists of chemically stable constituents. Tests have shown that when brought into direct contact with the Bioni coating, a 5-log reduction (99.999%) was proven in the dangerous hospital micro-organisms *Staphylococcus aureus* and *Enterococcus faecium* when compared to the 2-log - 4-log reduction (99.5% to 99.98%) that conventional coatings demonstrate.

Although the Bioni Hygienic was specially developed to improve hygiene in medical facilities, it finds applications in other sensitive building applications such as children's bedrooms, schools, kindergartens, bathrooms, showers and toilets, the food industry, and retirement homes for the elderly to name a few. Also, the Fraunhofer ICT is planning to introduce the Bioni coatings in other potential applications besides building coatings, which include dental implants, synthetic bones, catheters, artificial heart valves, food packages, and toys.

The R&D commitment of both Bioni and Fraunhofer can be witnessed from their healthy R&D spending. While Fraunhofer has an R&D budget of about 26 million per year, Bioni's R&D expenditure as a percentage of sales is approximately 7%. Bioni and Fraunhofer ICT have applied for a basic patent in Germany to protect this technology and are currently in the process of filing other international patents.

In conclusion, Frost & Sullivan's 2008 European Excellence in Research Award recognizes Fraunhofer Institute for Chemical Technology and the Bioni Company's joint research project spanning close to six years that has led to the creation of the Bioni Hygienic coating. The research efforts of Fraunhofer and Bioni are applauded by Frost & Sullivan as it has led to the development of a product that has moved out of the labs. The nontoxic volatile organic compound (VOC)-free coating system that prevents fungal growth and destroys even antibiotic-resistant bacteria could have a profound impact on the medical sector.

About Best Practices

Frost & Sullivan Best Practices Awards recognize companies in a variety of regional and global markets for demonstrating outstanding achievement and superior performance in areas such as leadership, technological innovation, customer service, and strategic product development. Industry analysts compare market participants and measure performance through in-depth interviews, analysis, and extensive secondary research in order to identify best practices in the industry.



About Frost & Sullivan

Frost & Sullivan, a global growth consulting company founded in 1961, partners with clients to create value through innovative growth strategies. The foundation of this partnership approach is our Growth Partnership Services platform, whereby we provide industry research, marketing strategies, consulting and training to our clients to help grow their business. A key benefit that Frost & Sullivan brings to its clients is a global perspective on a broad range of industries, markets, technologies, econometrics, and demographics. With a client list that includes Global 1000 companies, emerging companies, as well as the investment community, Frost & Sullivan has evolved into one of the premier growth consulting companies in the world.

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