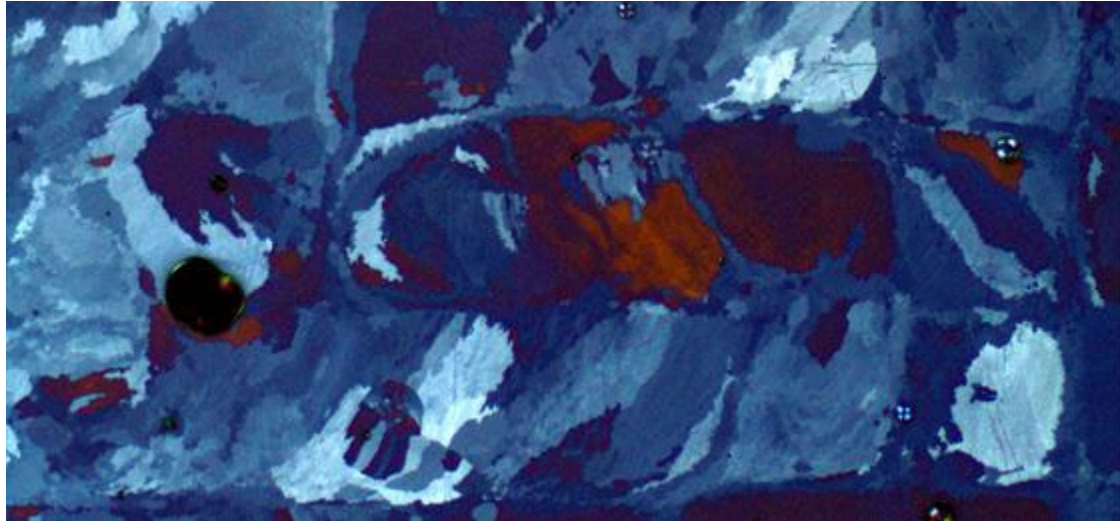




19.03.2015

Smart materials, smart researchers



Targeted drug delivery, medical devices and new electronic components: in the past five years, the National Research Programme “Smart Materials” (NRP 62) has explored the potential of a new generation of materials that react to external stimuli. The emphasis was on future applications.

Twenty-three industrial collaborations, twelve patents and two start-ups: the National Research Programme “Smart Materials” (NRP 62) has succeeded in encouraging an entrepreneurial spirit among scientists active in basic research. For the first time, the SNSF officially collaborated in a research programme with the Commission for Technology and Innovation (CTI) to encourage researchers to take their discoveries out of their labs and develop concrete applications. The lessons learned during the last five years will help in planning new types of collaboration between the two institutions. The goal is to accelerate the transfer of scientific results into practical applications that are sufficiently advanced to awaken the interest of various industries.

Many medical applications

The 21 projects of the programme fabricated – and used – new types of smart materials, new kinds of responsive materials that can change their properties when exposed to different stimuli. For instance, they become porous when heated, change shape when illuminated or twist like a spiral when immersed in water.

A number of projects looked at potential engineering applications, ranging from energy-harvesting devices to radically new types of electronics (see “Project highlights”).

The majority of the proposals submitted by the researchers deal with medical applications, in particular targeted drug delivery, where therapeutic molecules are precisely unloaded where and when desired,



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with the benefit of greatly reducing the required doses and thereby the side effects. Other researchers invented new medical devices, such as a sugar sensor for premature babies or elastic scaffolds for bone regrowth.

“We were surprised to see so many good medtech project applications,” says Louis Schlapbach, President of the Steering Committee of NRP 62. “Smart materials have a lot of potential in various disciplines. Fascination in science originates in the fact that you can never predict what you’ll find. In retrospect, our experience has shown that both medtech SMEs and larger companies are very open to original approaches coming from basic research.”

A recipe for innovation

NRP 62 was the first official collaboration programme of the SNSF with the CTI aimed at boosting technology transfer. “The idea was to create the right environment to inspire researchers to think from the start about possible applications,” says Louis Schlapbach.

CTI experts, who maintain close links to the industry, were included in the Steering Committee of the programme. Training and networking events helped young researchers to consider the practical potential of their discoveries and familiarised them with entrepreneurship issues, such as intellectual property and launching start-ups.

In the middle of the five-year programme, the Committee selected eleven projects for further funding (from the original 21) that had made good progress both scientifically and in developing industry contacts. At least seven projects will continue after the closure of NRP 62 as CTI projects.

“The focus on knowledge and technology transfer within NRP 62 was very profitable for the young researchers in my team,” says Dominique Pioletti from EPFL, who developed a targeted drug delivery system for damaged knee cartilage. “To transform my research into something directly useful is what drives me in science,” adds Martin Wolf from University Hospital Zurich, the inventor of a portable glucose sensor for premature babies. “Helping others can be an incredible motivation.”

Based on the experience gained from NRP 62, the SNSF and the CTI are jointly developing new instruments to boost innovation in Switzerland by filling the gap between basic research and prototypes.

National Research Programme “Smart Materials”

NRP 62 was launched in 2010 with a budget of CHF 11 million to support research in smart materials. This new generation of materials can modify their properties (such as mechanical, thermal, electrical or magnetic) when exposed to different stimuli. Their responsiveness could give rise to applications in many domains, from medicine to electronic sensors and energy efficiency.

A second goal of the programme was to encourage technology transfer from basic science into prototypes advanced enough for industrial or medical application. It is the first National Research Programme, an instrument of the Swiss National Science Foundation, to be conducted in collaboration with the Commission for Technology and Innovation.



Smart Materials
National Research Programme NRP 62

NRP 62 in numbers:

174 scientific publications
79 PhD students and postdocs
73 industrial contacts
23 industrial collaborations
21 projects
14 videos
12 patents
7 CTI projects
2 start-ups