

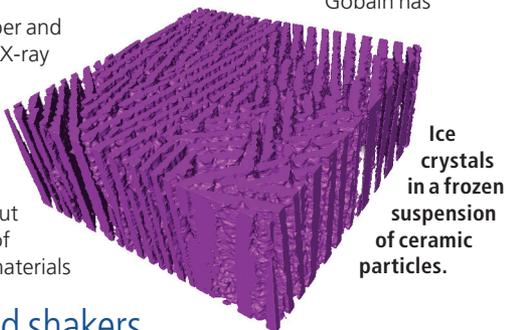
# Building the future

Industry giant Saint-Gobain is using the ESRF to develop advanced construction materials.

The traditional way to refresh the air inside a building is to open a window and let fresh outdoor air circulate. But this method tends to clash with the goal of reducing a building's energy consumption. Is there another way to improve the indoor air quality?

Research scientists at Saint-Gobain are using the ESRF to explore innovative construction materials that can remove pollutants from the air in built-up areas. "Indoor air quality is an increasingly important issue in building construction," says chemist Helena Kaper of Saint-Gobain CREE's Laboratory of Synthesis and Functionalisation of Ceramics (LSFC) in Cavallion, a joint laboratory with the CNRS. "We are studying the effect of different dopants in materials for air purification. The dopants are key to the performance of the materials, but we don't know precisely how."

Last June, Kaper and colleagues used X-ray absorption spectroscopy at the ESRF's BM23 beamline to extract information about the integration of dopants in the materials



Ice crystals in a frozen suspension of ceramic particles.

## Glass act: Saint-Gobain at a glance

Saint-Gobain is one of the largest companies in the world, with almost 200 000 employees in 65 countries and annual sales exceeding €40 bn.

From its beginnings as a glass manufacturer in Paris in 1665, the company has expanded into all aspects of construction materials and has 12 research

centres. Glass research is still a core activity, carried out at a joint CNRS laboratory in Aubervilliers, Paris. Scientists there have recently used the ESRF's ID15a and ID19 beamlines to study the interplay between the microstructure and the numerous chemical reactions at play during glass melting.

matrix of a sample, principally by looking at their neighbouring matrix atoms. "We hadn't used the technique before and we quickly realised that our samples were quite complicated, explains Kaper, adding that ESRF beamline staff were vital in guiding the experiment.

Strengthening its synchrotron connections further, Saint-Gobain has

recently funded an 18-month postdoc position at the ESRF to work with the LSFC. "Having a postdoc based here is a model for industry collaboration that we would like to see more of at the ESRF," says ESRF head of business development Ed Mitchell. Saint-Gobain's recent contact with the ESRF was established in 2009, when the ILL, CEA and ESRF organised an event to showcase their industry capabilities. "It was a chance to meet the people who did XAS on the beamlines," says Julie Russias of the Structure Lab at Saint-Gobain CREE.

Last year, X-ray tomography at BM05 allowed Saint-Gobain researchers to visualise micro-scale defects in monocrystals that contained very small,

poorly organised domains.

"We have a branch of Saint-Gobain that makes crystals for scintillators, which are used in light detection for security or medical applications," explains Russias. "One of the advantages of working for a large company such as Saint-Gobain is that it can invest in the basic science, and if we can't find any uses for it then we can move on to something else. Applications are long term."

Although most of Saint-Gobain's ESRF research is proprietary, the company has also used public beam time on ID15 and ID19 for imaging. In 2009, for instance, Sylvain Deville and co-workers at the LSFC froze a concentrated suspension of ceramic particles and were able to observe the growth of ice crystals *in situ*, shedding light on natural freezing mechanisms that affect the processing of construction materials (*Nature Materials* 8 966).

"For us the ESRF is really a need because it's a tool that gives us information on a scale that we cannot get in the lab," says Deville. "We are constantly discovering new X-ray techniques that are useful to us, so there is much more to come." *Matthew Chalmers*

## Movers and shakers

### Prize-winning thesis

ESRF user Anne Möchel, a physicist at the Peter Grünberg Institute at Jülich, has won the German Thermolectric Society's Young Researchers Award 2011 for her doctoral thesis: "Lattice dynamics in thermoelectric Zintl phases". While researching her thesis, Möchel made extensive use of the ESRF in addition to an impressive number of other major facilities both in Europe and the US.



of healthy skin and/or its reactions to environmental factors, to ESRF user Joke Bouwstra

of the Leiden Amsterdam Centre for Drug Research in the Netherlands. Bouwstra, who researches the skin barrier, plans to use the €40 000 award to undertake further research at the ESRF.

his collaboration within the French-Armenian partnership programme over the past 25 years.

### Back to school

In October, 30 European science teachers descended on Grenoble to attend a three-day course on the physics and chemistry of life, organised by EIROforum. Participants attended lectures and tutorials delivered by



researchers from the EMBL, the ESRF, ILL and the European XFEL, where they learnt how electrons, neutrons and X-rays can be used to enable 3D studies of proteins, macromolecular complexes, viruses and entire cells.

### That's 'Sir' Venki to you

Venki Ramakrishnan of the University of Cambridge in the UK, ESRF user and winner of the 2009 Nobel Prize in Chemistry, was knighted in the UK's 2012 New Year Honours list for services to molecular biology. The Queen confers the title of Knight Bachelor, which entitles male recipients to use "Sir" before their names, at a ceremony at Buckingham Palace.

### Skin studies recognised

French fashion house and cosmetics manufacturer Chanel has bestowed its 2011 CE.R.I.E.S. Award, which honours research concerning physiology or biology

### Going for gold

ESRF scientist Anatoly Snigirev has been awarded the gold medal of the RAMES State Committee of Science of the Republic of Armenia for