

# Chemists set to gain in Japan

**Renewed investment into fields such as nanotechnology should improve job prospects for inorganic chemists in Japan, says Robert Triendl.**

A decade ago, chemists in Japan were rushing into the rapidly evolving field of inorganic materials, such as ceramics. Fuelled by government-financed consortia, industrial research on inorganic materials and compounds was booming. At the same time universities and government research centres started numerous new departments and research groups.

But over the past few years, industrial research on inorganic materials has lost much of its glamour, as companies realized that associated markets were relatively small. Only a few years ago, about 20 companies were involved in research on materials such as silicon carbide, today there are only a handful, says Kazuyuki Kuroda, a chemistry professor at Waseda University in Tokyo.

Although there is general agreement that the excitement surrounding ceramics and inorganic materials has abated, research and development on inorganic materials for use in engineering and electronics continues. For Japan's troubled chemical companies — most of which have been slow to develop activities in highly value-added fields such as pharmaceuticals — such speciality chemicals often remain the only profitable part of their business.

But some observers argue that research on inorganic materials — and the whole field of inorganic chemistry — could yet see a revival. The recent discovery, by Jun Akimitsu and his colleagues at Aoyama Gakuin University, of high-temperature superconductivity in magnesium boron — a fairly standard material that can be bought off the shelf — is often cited as an example. "An unexpected discovery could soon trigger a new boom in research on inorganic materials," says Kuroda.

In the meantime, the attention of science-funding agencies and policy-makers has shifted towards the emerging field of nanotechnology. According to one estimate, the Japanese government has spent more than US\$350 million on nanoscience and nanotechnology during 2001, a sum that compares

favourably to spending levels in the United States and is well ahead of Europe. Nanotechnology funding is set to increase further during next year's budget.

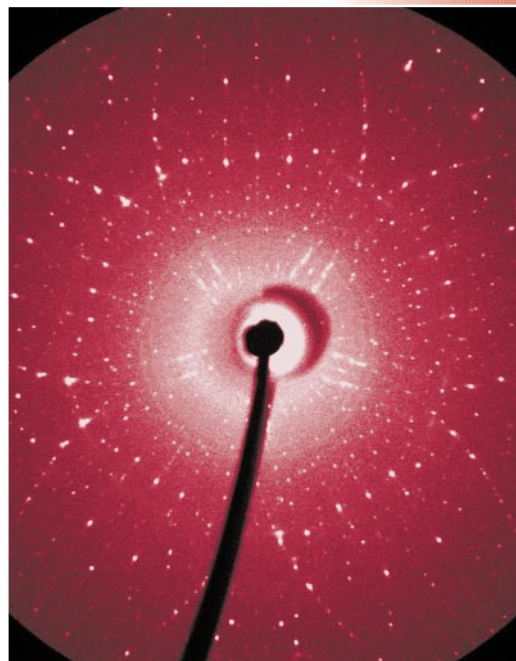
This surge in funding has already resulted in the creation of research centres and collaborations with major electronics companies that aim to develop semiconductor devices with features smaller than 100 nanometres. Also, following the decision to set up a research centre for nanomaterials at the newly created National Institute for Materials Science, many institutes and universities are planning to set up nanotechnology research centres, including the Institute for Physical and Chemical Research, Osaka University and the University of Tokyo.

Several chemical and electronics companies — including Fujitsu, Mitsubishi Chemical and Toray Industries — have announced plans to upgrade research activities in nanotechnology. Toray revealed last month that the firm intends to spend ¥5 billion (US\$40 million) on a new nanotechnology research centre to be set up in the company's pharmaceuticals research centre in Kamakura, near Tokyo. At its completion in 2003, the centre will host between 50 and 60 full-time researchers.

The boom in nanotechnology spending is likely to fuel renewed interest in computational research and simulations, which eventually could benefit the whole field of inorganic chemistry — including basic research, which has suffered from a continuing shortage of funding.

The Japan Science and Technology Corporation, a funding body associated with the education ministry, has announced plans to launch a new initiative in computational nanoscience to start in April 2002. In addition, the Ministry of Economics and International Trade intends to support a large national computational programme called the Chemical Reaction Simulator in 2002, an activity that was started by the Japan Chemical Innovation Institute, a consortium of companies in the chemical and polymer industries. ■

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Getting a boost: inorganic chemical research could benefit from Japanese investment in nanotechnology.