



Preface



Kazuo Nakajima

Director

The Institute was established at Tohoku Imperial University in 1916 by Professor Kotaro Honda as a steel research organization known officially as the 2nd Division of the Provisional Institute of Physical and Chemical Research. In 1987, the Institute was reorganized into its present form as a national collaborative research institute attached to Tohoku University. The name of the institute was consequently changed to the Institute for Materials Research (IMR). Since its establishment, IMR has become known for its excellence in both basic and applied research on metals and a wide range of new materials. A variety of functional materials have been studied and developed at the Institute, including the KS magnet steel, new KS magnet steel, SiC fiber, compound alloys, metallic glasses and others.

IMR has greatly contributed to the advancement of the materials science. As one example, our study of magnetism results in the invention of the strongest permanent magnet, the KS magnet, which dramatically improves the performance of electrical machines. IMR has been paying great attention to basic research that opens up the most advanced areas of applications. More recently, IMR has created a wide array of new materials, including high-performance, high-quality and multifunctional materials such as amorphous alloys, bulk metallic glasses, intermetallic compounds, quasicrystals, oxides, ceramics, nanostructured metals, Si, Ge, III-V, II-VI and oxide semiconductors, optical and electronic materials, solar cell crystals, biomaterials, organic materials, hydrogen storage alloys, and shaped crystals.

Now, we are facing the serious issue of the deteriorating global environment and the depletion of worldwide natural resources and energy sources. IMR will further promote materials research to address the problems associated with the global environment and energy resources, aiming at sustaining human development and ensuring a high standard of living for all people. In this way, we will offer a brighter future for the next generation.

In order to publicize our research activities and their results throughout the world, IMR decided to launch a new report titled *KINKEN Research Highlights*. "KINKEN" is the short Japanese name of IMR, which is familiar to materials community, particularly in Japan. This publication is a new style annual report to present IMR's research activities and achievements to the world.

The research in IMR is focusing on the following four key fields: (1) Nano/Micro Structure Controlled Materials, (2) Future Energy/Environmental Materials, (3) Innovative Electronic Materials, and (4) Advanced Nuclear Energy Materials.

In the *Highlights* all the reports and articles are organized according to these four fields. Explanations of activities are also provided both for the domain of research carried out by the individual research divisions and centers, and for the domain of research carried out by the joint projects. Many figures and illustrations are used to help non-experts and general readers to easily understand and enjoy the reported research.

We earnestly hope that *KINKEN Research Highlights* will help you recognize and support our research activities and serve as the medium to promote world-wide collaborations in materials research with our institute.