Overview of development of magnetic material technology for high-efficiency motors in Future Pioneering Program of Japan

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Nd-Fe-B permanent magnet has the highest performance in the world. This includes a heavy rare-earth element, such as Dy or Tb, for high coercivity and for efficiency in high-temperature using. However, these elements are very ‘rare metal’ in the globe. These have not only low crustal abundance, but alsothe problem of being mindedonly within a confined geographic area. Then, Nd-Fe-B permanent magnet without heavy rare-earth element and with the same or more magnetic performance than conventional oneneeds to be developed. Additionally, development of a new permanent magnet with superior performance is expected.

In Japan, a national project of development of Dy-less Nd-Fe-B permanent magnet was executed from 2007 to 2011.Then, Future Pioneering Program started from 2012. In the program, a project of “development of magnetic material technology for high-efficiency motors” has been executed. The project has been carried out in the technology research association of Magnetic materials for High-Efficiency Motors; MagHEM. The technology research association consists of companies and national research institute. The aim of the project is development of high-performance magnetic materials and high-efficiency motors. The development subjects of magnetic materials are high performance Nd-Fe-B magnet without Dy of Tb, new permanent magnets and soft magnetic materials.

On this day, the overview of the project will be described.

Introduction

Kimihiro Ozaki is a Japanese researcher of materials processing and engineering. He received his PhD. in micro-discharge phenomena and processing from Osaka University in 1994. In that year, he joined the National Industrial Research Institute of Nagoya, which is the precursor of the National Institute of Advanced Industrial Science and Technology; AIST. Hehas researched development of non-equilibrium materials based on powder metallurgy, such as an amorphous alloy, a nano-crystallized alloy and an easily-decomposable material. Especially, his research of sintering process has contributed to producing the non-equilibrium materials from hardly-sinterable powder. In these days, he has taken part in a national project of ‘rare metal’, such as development of tungsten less cutting tool for hard metal tools. At the present, he is the project leader of development of magnetic material technology for high-efficiency motors in Future Pioneering Program of Japan.