

# Progress in the development of Dy-free high coercivity Nd-Fe-B permanent magnets

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Due to the recent concern of the scarce supply of heavy rare earth (HRE) elements, finding a way to increase the coercivity of Nd-Fe-B magnets without using Dy has become the center of PM research in Japan. In this talk, we will give an overview on our recent progress towards the development of high coercivity Dy-free Nd-Fe-B permanent magnets. Based on the microstructure-coercivity relationships investigated by multi-scale characterization with SEM, TEM and atom probe tomography (APT), we discuss the way to achieve a coercivity higher than 2.5 T in Nd-Fe-B based PMs without HRE. Toward the end, I will introduce the activities on PM research in the Elements Strategy Initiative Center for Magnetic Materials (ESICMM) that has been newly launched at NIMS last year and discuss what kind of fundamental researches are required for next generation permanent magnets.

## About the Speaker

Kazuhiro Hono received his BS (1982) and MS (1984) degrees in Materials Science at Tohoku University and a Ph.D. degree in Metals Science and Engineering at the Pennsylvania State University in 1988. After working as a post doc at Carnegie Mellon University for a year, he became a research associate at the Institute for Materials Research, Tohoku University in 1990. He moved to the National Research Institute for Metals (currently National Institute for Materials Science, NIMS) as a senior researcher in 1995, and is now a NIMS Fellow and the Director of the Magnetic Materials Unit. He is also a professor in Materials Science and Engineering at the Graduate School of Pure and Applied Sciences at the University of Tsukuba. His major research interest is microstructure-property relationships of metallic materials, in particular magnetic materials. He received TMS Fellows Award, the Japan Institute of Metals Distinguished Achievement Award in 2011, and the Magnetic Society of Japan's Achievement Award in 2013. He has been editor of *Acta Materialia* and principal editor of *Scripta Materialia* for over 10 years.