

MATERIALS SCIENCE and ENGINEERING SEMINAR



Dr. Naoki Ohashi

*Director of the Research Center for Electronic and
Optical Materials*

National Institute for Materials Science (NIMS)

Recent Advances in Optoelectronic Materials at NIMS

In this presentation, I will introduce the latest developments in optoelectronic materials at the National Institute for Materials Science (NIMS). Our research covers a range of innovative materials—including diamond, wide-band-gap nitrides, gallium oxides, phosphors, scintillators, and various compound semiconductors—with applications spanning high-power devices and quantum technologies.

A special focus will be placed on our recent findings concerning ferroelectricity in wurtzite-type compounds. Wurtzite-structured semiconductors, well known for their excellent performance in LEDs, LDs, and power electronics, are now revealing a new and exciting facet: ferroelectric behavior. In particular, we have discovered that nominally undoped AlN exhibits clear ferroelectric properties, including reversible polarity switching.

In this talk, I will discuss the underlying mechanisms of ferroelectric switching in AlN, as illuminated by our latest experimental results and simulation studies. These insights open up new possibilities for the next generation of optoelectronic and electronic devices.

BIOGRAPHY

Dr. Naoki Ohashi is a director of the Research Center for Electronic and Optical Materials at the National Institute for Materials Science (NIMS), Japan. He received his Ph.D. in Engineering from Tokyo Institute of Technology in 1992. After serving as an assistant professor at Tokyo Tech, he started researching oxide semiconductors. He later joined MIT as a visiting scholar in 1999-2000. Since 2000, he has worked at NIMS, contributing to crystal growth and defect engineering in electroceramics and optoelectronic materials. He has received international honors, including the Richard M. Fulrath Award (The American Ceramic Society), Doctorat Honoris Causa from Rennes University, France, and the French National Order of Merit Chevalier. Dr. Ohashi is also active in education, industry collaboration, and the leadership of national materials science programs.

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