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Power GaN: Innovation scenario toward the society without energy loss

Gallium nitride (GaN) is currently the most ideal semiconductor for power transistors and other power devices. It has been found that GaN has much better performances in comparison with silicon carbide (SiC) as well as Si from a view point of condensed matter physics. However, GaN power devices (power GaNs) have not yet been applicable to power electronics devices for inverters/converters, power conditioners, electric vehicles and other transportation

systems, although theoretical calculations have revealed that the change from power Si to power GaN will bring about more than 90 percent cut of the energy loss to the society. In the present work, we will discuss what disturbs the appearance of power GaN and draw an innovation scenario toward the society without energy loss from both aspects of physics studies and industry studies.

Biography

Eiichi Yamaguchi is the Professor, Graduate School of Advanced Integrated Studies in Human Survivability, Kyoto University. He received a Master of Science degree and a Doctor of Science degree, respectively in 1977 and 1984 both from The University of Tokyo. He has been a Physicist, since he joined NTT Basic Research Laboratory in 1979. He also served as a visiting scholar of University of Notre Dame, USA, from 1984 to 1985, and as a Guest Scientist of IMRA Europe, France, from 1993 to 1998. He served as a Professor of Doshisha University, Kyoto, from 2003 to 2014. From 2008 to 2009, he served as a Visiting Fellow of Clare Hall, University of Cambridge. In 2014, he was appointed as a professor of Kyoto University. He founded four venture companies, ArcZone K.K. (1998), Powdec K.K. (2001), ALGAN K.K. (2005), and CONNEX SYSTEMS K.K.(2011) and is currently a Board Member of Powdec K.K. He published "Innovation : Paradigm Disruption and Fields of Resonance" (NTT Publishing) in 2006, "Recovering from Success: Innovation and Technology Management in Japan" (Oxford University Press) in 2006, "JR Fukuchiyama Line Incident : Rethinking Corporate Social Responsibility from Science" (NTT Publishing) in 2007, "Five Physics Theories to Learn Before You Die" (Chikuma Shobo Publishing) in 2014, "Science of Science, Technology and Innovation Policy" (The University of Tokyo Publishing) in 2015, "Why Innovation Ceased: Crisis of Scientific Japan" (Chikuma Shobo Publishing) in 2016 and "The Graves of Physics: Seeking the Secret of Inspiration" (Nikkei BP) in 2017.

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