

# DRAM Reliability Overview



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## **Abstract:**

As DRAM has been scaled down, reliability issues have been getting worse and new issues have been arisen from new materials, integration schemes, and operation modes. In this tutorial, we will cover reliability mechanisms and current reliability challenges of DRAM's Cell/Core/Periphery transistors, including Row-Hammer, variable retention time (VRT), HEIP, drain off stress, HCI and BTIs.

## **Biography:**

**Hokyung Park** received his Ph. D in electronic material science and engineering at the Gwangju Institute of Science and Technology, Korea in 2007. During Ph. D, he was a visiting student of microelectronic research center in the University of Texas at Austin (2004-2006). In 2008-2010, he was with SEMATECH, conducting electrical characterization and reliability evaluation of high-K dielectrics and memory devices. In 2011-14, he was advanced CMOS development reliability engineer in Texas Instruments. Currently, he is a director of develop reliability in SK Hynix.

He has over 5 US/Korea patents, 20 journal papers, 50 conference papers and served committee member of international conferences, including IRPS, IEDM, IRW, IMW etc.

**Seong-Wan Ryu** received B.S. from Hanyang University, Seoul, Korea, in 1994, and M.S. and Ph.D. degree from the Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea in 2006 and 2009, respectively.

Since 2009, he has been with, SK Hynix Inc., Kyungki, Korea, and he developed 2x-nm (4Gb) and 1z-nm (16Gb) technology node DRAMs. Especially, he developed and applied the dual-gate cell transistor scheme for the first time in the world for the 2x-nm technology node.

Dr. Ryu was the recipient of the Best Poster Paper Award at the 2006 IEEE Nanotechnology Materials and Devices Conference and the 2014 SK Group Award (SKMS) with “Proposal and Early Setup of New Cell Transistor for the Next Generation DRAM Product”. He conducted a seminar on the subject of the reliability issue of the ultimately scaled DRAM at 2017 SEMICON KOREA.