



PROF. JOHN ROBERTSON

Towards reliable gate stacks on Ge and III-Vs channels

BIOGRAPHY

Professor John Robertson is a Professor of Electronic Engineering at Cambridge University, UK. He is a Fellow of the IEEE, the American Physical Society and of the Materials Research Society. He received his BA degree in Natural Science from Cambridge University and his PhD in Physics from Cambridge University. After working in industry for 18 years, he joined the Engineering Department of Cambridge University in 1994.

He has published about 600 journal papers, with over 33,000 citations and is a ISI highly cited author in Materials Science. His research interests are in electronic materials in general, such materials for the CMOS gate stack, high dielectric constant oxides, thin film transistors including amorphous semiconducting oxides, carbon nanotubes, graphene, diamond-like carbon and CVD processes.

He is an Associate Editor of Journal of Applied Physics, and has been on the Editorial Board of Physical Review



Abstract

There are a number of proposals about how to deposit gate stacks with a fairly low density of interface traps, based on different ideas. Some of these use Al₂O₃ layers as a component of the gate stack. Some of this is based on the idea that TMA inserts into As-As dimer bonds on the surface, and/or that Al₂O₃ is a diffusion barrier to sub-surface oxidation of the III-V or to degradation on the Ge/GeO₂ interface. But IMEC have noted that Al₂O₃ leads to lower reliability due to the energy defect spectrum of the Al₂O₃. Ways around this based on DFT calculations are presented.