"BEOL reliability challenges and its interaction with process integration"

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Introduction to the topic:
In former technologies nodes the reliability investigation was a central part of the process qualification but mainly served as verification for the technology development success only. In recent technologies, latest since 65nm technology node, the reliability characterization is becoming one major part of the technology development itself. It has strong impact on the choice of process options or necessary process changes. Future technology nodes are very challenging with respect to meeting reliability targets. Only with carefully chosen unit process options and an optimized balance between design and reliability demands, technology nodes of 32nm dimensions and beyond can be successfully introduced.

In this tutorial the interaction between process options and reliability requirements will be covered and several critical aspects to ensure BEOL reliability in 32nm technology nodes and beyond will be discussed.

Structure of tutorial:
The tutorial will only basically cover the BEOL reliability physics and statistics. Besides that the key topics of the tutorial are:

1. "Natural" electromigration robustness crisis
2. Process options for improving electromigration robustness
3. The trade-off between electromigration performance boost and TDDB lifetime
4. Critical process influence on TDDB
5. BEOL reliability in times of 22nm technology node

Who should attend:
This tutorial is designed for participants with a basic background in BEOL reliability physics who want to get a better understanding of the process influence on the reliability performance. It provides an insight into the correlation between process choices and decisions of process changes and reliability targets.

Biography of tutorial speaker:
Dr. Oliver Aubel has earned his diploma (M.S.) in electrical engineering with focus on microelectronic engineering from the University of Hannover (Germany) in 2000. Early 2004 he finished his PhD study at the same university with focus on highly accelerated (oder: "ultra fast") electromigration testing. Immediately after that he joined GLOBALFOUNDRIES (formerly AMD) (Germany) as a reliability engineer for interconnect reliability. In his early years at GLOBALFOUNDRIES he was assigned to the IBM technology development alliance at Burlington site in Vermont, US (2004-2005) responsible for the reliability transfer to GLOBALFOUNDRIES.
After returning to Germany, he is now responsible for the whole BEOL reliability characterization as well as the reliability interaction between GLOBALFOUNDRIES (Germany) and IBM technology development alliance for both SOI and BULK technologies.

He underlines his knowledge of process and reliability interaction with several patent applications and his major contribution to over 30 international publications.