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Back-End of Line (BEOL) Reliability

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Baozhen Li has a Ph.D. degree in Materials Science and Engineering from the University of Notre Dame. He is currently a Senior Technical Staff Member at IBM Systems, focusing on reliability and product/technology interactions, working between foundry and chip design and product integration. Prior to IBM's divestiture of its semiconductor manufacturing in 2015, he was a leading engineer for BEOL reliability to support technology development, manufacturing and chip design. He served as committee chairs of BEOL Reliability & Low K TDDB and gave two tutorials previously for IRPS.

BEOL reliability has been an important part of semiconductor technology development and qualification. It focuses on the integrity of the on-chip interconnect stacks. The wear-out failure mechanisms include electromigration (EM), stress migration/voiding (SM/SV), thermal mechanical stability, low K dielectric breakdown (TDDB) and chip/package interactions (CPI). Following the introduction of physical and statistical fundamentals of these mechanisms, this tutorial will provide examples of reliability analysis at chip and system level. Discussions will also be made on the challenges to the BEOL reliability with the new technology scaling, material set and integration schemes.