

SESSION 4

YIELD

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The Yield Session includes five papers from major compound semiconductor companies. The first two papers are from Skyworks. The first, about an issue that probably frustrates everyone, covers reduction of wafer breakage. Skyworks shows that breakage is initiated by micro scratching and is completed by specific processes and tools. The paper covers many factors and demonstrates impressive reduction rates. The second paper explains how Skyworks involved their technicians and engineers to reduce the cost of equipment maintenance and repair while increasing wafer moves. The paper details changes that extended equipment lifetimes, safely extended time between PMs, a change in consumables that saved time and money, a change to repair rather than replace equipment and switching to repairing in-house rather than externally. The paper not only gives several specific examples that saved money, but also tells about one that did not work. The third paper of the session, by RF Micro Devices, details the methodology they used to find a series of yield problems in a product for the WLAN market. They present a learning timeline showing how data analysis, device modeling and identification of root causes come together in a successful resolution with yield improvement. The fourth paper, by WIN Semiconductors, gives examples of yield improvement in GaN devices. Combining specific changes to gate modules and also some epi buffer engineering, ultimately led to a final combination producing the best device results. They cover characterization and test methods to show some yield culprits and also to demonstrate improvement. The final paper shows how HRL Labs effectively uses the massive amounts of data collected from in-line process control modules to verify process stability, improve performance, find the root cause of problems that arise, and feedback characteristics to MMIC designs for improvements. The examples covered are quite specific and HRL demonstrates that high volume GaN products can be produced with solid quality control and a path to continual process improvement.

