

## **Materials understanding is the key to new innovations in microelectronics**

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The ongoing trend of miniaturization in the microelectronics industry has introduced new challenges, particularly as processing speeds continue to increase alongside the shrinking of components, leading to higher power densities. Operating microelectronic devices inherently generates heat, and as these devices achieve higher speeds, the amount of heat produced becomes more significant. At the same time, their smaller sizes make heat dissipation more difficult, which can result in reduced reliability and performance degradation. The operating temperature has a linear effect on device performance and an exponential effect on failure rates. This underscores the growing importance of material research, particularly in thermal analysis. Consequently, methods that enable the investigation of thermal behavior from the wafer level to the system level are essential.