Negative Bias Temperature Instability (NBTI) recovers fully with bake at 325 C or above and the device is equivalent to new. ANASTASIOS KATSETOS, IBM — Negative Bias Temperature Instability (NBTI) is one of the major degradation mechanisms of PMOSFET devices. When the p-channel Field Effect Transistor (PFET) gate is biased negatively with respect to the channel, as in CMOS inverter, at elevated temperature the threshold voltage (Vt) decreases (absolute value increases for application temperatures) and the drive current (Ion) decreases. This degrades the device performance and may lead to circuit failure. NBTI is process dependent and has strong dependence on temperature, gate voltage, time, and gate oxide thickness. It also depends on device area and or geometry. NBTI models used in industry are empirical. I have observed, on different technologies, in the last several years that NBTI recovers with bake. The recovery amount depends on the bake temperature, which can be the stress temperature, and happens very fast at any temperature. Full recovery is achieved at temperatures above 325 degrees C. After full bake recovery the device behaves like new with NBTI equal to the NBTI of the original stress.