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Effect of Temperature on Surface Recombination Current at SiO_2/Si Interface Traps BIN B. JIE, ZUHUI CHEN, CHIH-TANG SAH, University of Florida — Temperature dependences of recombination current at interface traps in MOS transistor structure are investigated using the Shockley-Read-Hall DC recombination-current-voltage (R-DCIV) characteristics. Results include the effects of energy distribution of the interface traps (discrete, constant and U-shaped energy distributions) on the temperature dependences of the base-terminal-current-versus-gate-voltage lineshape (I_B-V_{GB}), peak current and voltage (I_{B-peak}, $V_{GB-peak}$) and their thermal activation energy E_A, and the reciprocal slope n of the I_{B-peak} versus base/drain (or base/source) p/n junction forward voltage V_{BD}. Surface impurity concentration and oxide thickness are varied. Temperature dependences of E_A, $V_{GB-peak}$ and n are small while I_{B-peak} and R-DCIV linewidth, large. The insensitivity of I_{B-peak} and n on material properties allows experimental extraction of effective interface trap energy distribution.

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