High-performance Strained Si-on-Insulator MOSFETs by Novel Fabrication Process Utilizing Ge-Condensation Technique

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Strained SOI (SSOI)-nMOSFETs with enhanced mobility up to 67% were fabricated on a SiGe-on-insulator substrate using a novel Ge-condensation technique. This method, using only standard Si processes, realizes smooth SSOI surfaces without using surface polishing and any other special processes. Relaxation ratio of the SiGe substrate was varied from 0% to 100%, resulting in the control of threshold voltage. The Ge-condensation process is attractive technique for fabrication of multi-threshold SSOI-CMOS circuits with high current drive.