Fabrication of a novel strained SiGe:C-channel planar 55nm nMOSFET for High-Performance CMOS

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We present for the first time strained epitaxially grown Si:C and SiGe:C channel NMOS devices compatible with a standard 50nm CMOS process flow. The advantages of this new architecture for CMOS integration are a highly retrograde channel doping profile and a suppression of boron diffusion and Oxidation Enhanced Diffusion, leading to a dramatic decrease of short channel effects. Mobility in the Si:C and SiGe:C inversion layer is characterized for the first time (77K to 300K) and optimized.