METHOD OF FORMING A RELAXED SEMICONDUCTOR BUFFER LAYER ON A SUBSTRATE WITH A LARGE LATTICE MISMATCH

ABSTRACT

A method of forming a relaxed silicon - germanium layer for use as an underlying layer for a subsequent, overlying tensile strain silicon layer, has been developed. The method features initial growth of a underlying first silicon - germanium layer on a semiconductor substrate, compositionally graded to feature the largest germanium content at the interface of the first silicon - germanium layer and the semiconductor substrate, with the level of germanium decreasing as the growth of the graded first silicon - germanium layer progresses, with the magnitude of lattice mismatch and threading dislocations decreasing as well. This is followed by in situ growth of an overlying silicon - germanium layer. In situ growth of a silicon layer results in a tensile strain, low defect density layer.

FIG. 5