Abstract

Semiconductor layer structure and method for fabricating a semiconductor layer structure

Semiconductor layer structure, comprising a substrate (1) made of semiconductor material, on which a layer (2) made of a second semiconductor material is situated, furthermore a region (3) enriched with impurity atoms, which region is situated either in layer (2) or at a specific depth below the interface between layer (2) and substrate (1), additionally a layer (4) within the region (3) enriched with impurity atoms, which layer comprises cavities produced by ion implantation, furthermore at least one epitaxial layer (6) applied to layer (2) and also a defect region (5) comprising dislocations and stacking faults within the layer (4) comprising cavities, the at least one epitaxial layer (6) being largely crack-free, and a residual strain of the at least one epitaxial layer (6) being less than or equal to 1 GPa.

Method for fabricating a semiconductor layer structure, comprising the following steps: a) provision of a substrate (1) made of a semiconductor material; b) application of a layer (2) made of a second semiconductor material to said substrate (1) for the purpose of producing a semiconductor layer structure; c) implantation of light gas ions into the semiconductor layer structure for the purpose of producing a layer (4) comprising cavities in the semiconductor layer structure; d) stabilization of said cavities by impurity atoms of a specific species; e) application of at least one epitaxial layer (6) to the semiconductor layer structure.

Fig. 3