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(54) Title: EPITAXIAL STRUCTURE OF N-POLAR SURFACE ALGAN-BASED ULTRAVIOLET PHOTOELECTRIC DETECTOR, AND PREPARATION METHOD FOR EPITAXIAL STRUCTURE

(54) 发明名称: N 极性面 AlGaIn 基紫外光电探测器外延结构及其制备方法

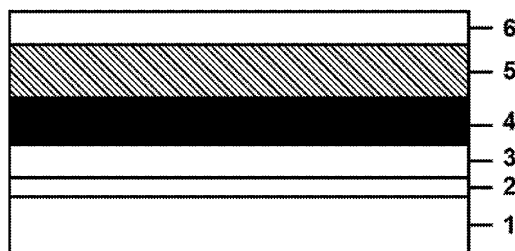


图 1

(57) Abstract: Disclosed in the present invention are an epitaxial structure of an N-polar surface AlGaIn-based ultraviolet photoelectric detector, and a preparation method for the epitaxial structure. The epitaxial structure of an N-polar surface AlGaIn-based ultraviolet photoelectric detector comprises: a non-doped N-polar surface AlN buffer layer, a carbon-doped semi-insulated N-polar AlN buffer layer, a carbon-doped N-polar surface composition-gradient $Al_xGa_{1-y}N$ buffer layer and a non-doped N-polar surface $Al_xGa_{1-x}N$ layer, which are sequentially grown on a silicon substrate, wherein $x = 0.5-0.8$, and $y = 0.75-0.95$. By means of the epitaxial structure of an N-polar surface AlGaIn-based ultraviolet photoelectric detector provided in the present invention, the power and detection rate of an AlGaIn-based ultraviolet detector are enhanced, thereby increasing a photoelectric response degree of the ultraviolet photoelectric detector, and effectively reducing the subsequent machining difficulty in a device. By means of the preparation method provided in the present invention, the dislocation density and surface roughness of an N-polar AlGaIn epitaxial layer, which is grown by means of high-temperature MOCVD, are reduced.

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根据细则4.17的声明:

— 发明人资格(细则4.17(iv))

本国际公布:

— 包括国际检索报告(条约第21条(3))。

(57) 摘要: 本发明公开了一种N极性面AlGa_N基紫外光电探测器外延结构及其制备方法, 所述N极性面AlGa_N基紫外光电探测器外延结构包括: 在硅衬底上依次生长的非掺杂N极性面AlN缓冲层、碳掺杂半绝缘化N极性AlN缓冲层、碳掺杂N极性面组分渐变Al_yGa_{1-y}N缓冲层和非掺杂N极性面Al_xGa_{1-x}N层; 其中, $x = 0.5 \sim 0.8$, $y = 0.75 \sim 0.95$ 。本发明提供的N极性面AlGa_N基紫外光电探测器外延结构, 增强了AlGa_N基紫外探测器的功率和探测率, 提高了紫外光电探测器的光电响应度并有效降低后续器件加工难度; 本发明提供的制备方法, 降低了高温MOCVD生长的N极性AlGa_N外延层的位错密度和表面粗糙度。