

**N-POLAR PLANE ALGaN-BASED ULTRAVIOLET PHOTODETECTOR
EPITAXIAL STRUCTURE AND PREPARATION METHOD THEREOF**

ABSTRACT

5 The present invention discloses an N-polar plane AlGaN-based ultraviolet photodetector epitaxial structure and a preparation method thereof. The N-polar plane AlGaN-based ultraviolet photodetector epitaxial structure includes: an undoped N-polar plane AlN buffer layer, a carbon-doped semi-insulated N-polar AlN buffer layer, a carbon-doped N-polar plane graded-composition $\text{Al}_y\text{Ga}_{1-y}\text{N}$ buffer layer and an undoped N-polar plane $\text{Al}_x\text{Ga}_{1-x}\text{N}$ layer
10 sequentially grown on a silicon substrate, and wherein $x=0.5$ to 0.8 and $y=0.7$ to 0.95 . The N-polar plane AlGaN-based ultraviolet photodetector epitaxial structure provided by the present invention improves the power and detectivity of AlGaN-based ultraviolet detectors, improves the photoelectric responsivity of the ultraviolet photodetector, and effectively reduces the processing difficulty of subsequent devices. The preparation method provided by the present
15 invention reduces the dislocation density and surface roughness of the N-polar AlGaN epitaxial layer grown by high-temperature MOCVD.

FIG. 1