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Singh et al.

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(54) **SOLID SOLUTION WIDE BANDGAP SEMICONDUCTOR MATERIALS**

(58) **Field of Classification Search** 117/68,
117/84, 89, 104
See application file for complete search history.

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(57) **ABSTRACT**

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A substrate and method for growing a semi-conductive crystal on an alloy film such as $(\text{AlN})_x(\text{SiC})_{(1-x)}$ without any buffer layer is disclosed. The $(\text{AlN})_x(\text{SiC})_{(1-x)}$ alloy film can be formed on a SiC substrate by a vapor deposition process using AlN and SiC powder as starting materials. The $(\text{AlN})_x(\text{SiC})_{(1-x)}$ alloy film provides a better lattice match for GaN or SiC epitaxial growth and reduces defects in epitaxially grown GaN with better lattice match and chemistry.

(65) **Prior Publication Data**

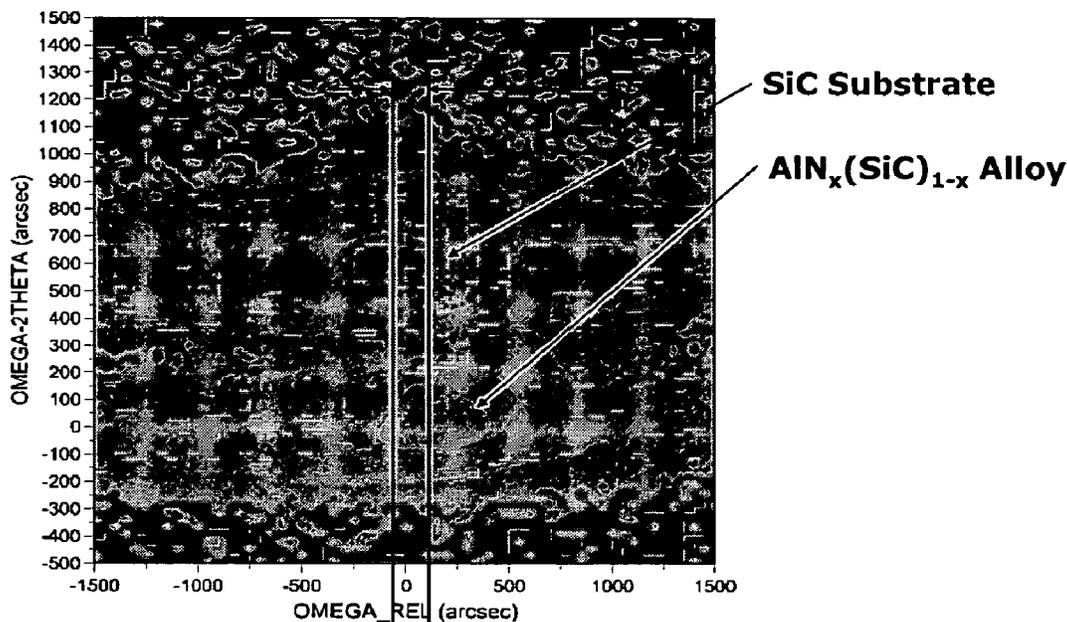
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C30B 25/12 (2006.01)
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17 Claims, 7 Drawing Sheets

Reciprocal Space Map



$\Delta\omega = 254.9\text{arcsec} = 0.0708^\circ$