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(74) Agent: **MALEWSKA, Ewa**; Klaudyny 32/299,
PL-01-684 Warszawa (PL).

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(71) Applicants (*for all designated States except US*): **AM-MONO SP. ZO.O.** [PL/PL]; Czerwonego Krzyza 2/31, PL-00-377 Warszawa (PL). **NICHIA CORPORATION** [JP/JP]; 491 Oka, Kaminaka-cho, Anan-shi, Tokushima-ken 774-8601 (JP).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **DWILINSKI, Robert** [PL/PL]; Zgrupowania Zmija 23/12, PL-01-875 Warsaw (PL). **DORADZINSKI, Roman** [PL/PL]; Belgradzka 4/115, PL-02-793 Warsaw (PL). **GARCZYNSKI, Jerzy** [PL/PL]; Baczynskiego 20/7, PL-05-092 Lomianki (PL). **SIERZPUTOWSKI, Leszek, P.** [PL/PL]; 304 Huntington Road, Union, NJ 07083-7944 (PL). **KANBARA, Yasuo** [JP/JP]; Oohara Kusunome 8 Banti no 5, Nagaike-cho, Anan-shi, Tokushima-ken (JP).

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(54) Title: SUBSTRATE FOR EPITAXY

(57) Abstract: The invention relates to a substrate for epitaxy, especially for preparation of nitride semiconductor layers. Invention covers a bulk nitride mono-crystal characterized in that it is a mono-crystal of gallium nitride and its cross-section in a plane perpendicular to c-axis of hexagonal lattice of gallium nitride has a surface area greater than 100 mm², it is more than 1,0 μm thick and its C-plane surface dislocation density is less than 10⁶/cm², while its volume is sufficient to produce at least one further-processable non-polar A-plane or M-plane plate having a surface area at least 100 mm². More generally, the present invention covers a bulk nitride mono-crystal which is characterized in that it is a mono-crystal of gallium-containing nitride and its cross-section in a plane perpendicular to c-axis of hexagonal lattice of gallium-containing nitride has a surface area greater than 100 mm², it is more 1,0 μm thick and its surface dislocation density is less than 10⁶/cm². Mono-crystals according to the present invention are suitable for epitaxial growth of nitride semiconductor layers. Due to their good crystalline quality they are suitable for use in opto-electronics for manufacturing opto-electronic semiconductor devices based on nitrides, in particular for manufacturing semiconductor laser diodes and laser devices. The a.m bulk mono-crystals of gallium-containing nitride are crystallized on seed crystals. Various seed crystals may be used. The bulk mono-crystals of gallium-containing nitride are crystallized by a method involving dissolution of a gallium-containing feedstock in a supercritical solvent and crystallization of a gallium nitride on a surface of seed crystal, at temperature higher and/or pressure lower than in the dissolution process.



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