Shuji Nakamura

List of Publications by Year
in descending order

138 papers	7,992 citations	71102 41 h-index	48315 88 g-index
143 all docs	143 docs citations	143 times ranked	5745 citing authors

#	Article	IF	Citations
1	Prospects for LED lighting. Nature Photonics, 2009, 3, 180-182.	31.4	1,847
2	Highâ€power InGaN/GaN doubleâ€heterostructure violet light emitting diodes. Applied Physics Letters, 1993, 62, 2390-2392.	3.3	638
3	Semipolar $({hbox{20}}ar{{hbox{2}}}ar{{hbox{1}}})$ InGaN/GaN Light-Emitting Diodes for High-Efficiency Solid-State Lighting. Journal of Display Technology, 2013, 9, 190-198.	1.2	316
4	Nonpolar and Semipolar III-Nitride Light-Emitting Diodes: Achievements and Challenges. IEEE Transactions on Electron Devices, 2010, 57, 88-100.	3.0	230
5	Exciton localization in InGaN quantum well devices. Journal of Vacuum Science & Technology an Official Journal of the American Vacuum Society B, Microelectronics Processing and Phenomena, 1998, 16, 2204.	1.6	227
6	High-brightness polarized light-emitting diodes. Light: Science and Applications, 2012, 1, e22-e22.	16.6	217
7	High efficiency of III-nitride micro-light-emitting diodes by sidewall passivation using atomic layer deposition. Optics Express, 2018, 26, 21324.	3.4	213
8	Robust thermal performance of Sr2Si5N8:Eu2+: An efficient red emitting phosphor for light emitting diode based white lighting. Applied Physics Letters, 2011, 99, .	3.3	202
9	Measurement of electron overflow in 450 nm InGaN light-emitting diode structures. Applied Physics Letters, 2009, 94, 061116.	3.3	181
10	Sustained high external quantum efficiency in ultrasmall blue IIIâ€“nitride micro-LEDs. Applied Physics Express, 2017, 10, 032101.	2.4	169
11	Indium incorporation and emission properties of nonpolar and semipolar InGaN quantum wells. Applied Physics Letters, 2012, 100, .	3.3	168
12	Optical properties of yellow light-emitting diodes grown on semipolar (112Â¯2) bulk GaN substrates. Applied Physics Letters, 2008, 92, .	3.3	167
13	Efficient and stable laser-driven white lighting. AIP Advances, 2013, 3, .	1.3	151
14	Size-independent peak efficiency of III-nitride micro-light-emitting-diodes using chemical treatment and sidewall passivation. Applied Physics Express, 2019, 12, 097004.	2.4	132
15	Reviewâ€”Progress in High Performance III-Nitride Micro-Light-Emitting Diodes. ECS Journal of Solid State Science and Technology, 2020, 9, 015012.	1.8	110
16	Hybrid tunnel junction contacts to IIIâ€“nitride light-emitting diodes. Applied Physics Express, 2016, 9, 022102.	2.4	105
17	Improved performance of AlGaInP red micro-light-emitting diodes with sidewall treatments. Optics Express, 2020, 28, 5787.	3.4	105
18	Partial strain relaxation via misfit dislocation generation at heterointerfaces in (Al,In)GaN epitaxial layers grown on semipolar (112Â¯2) GaN free standing substrates. Applied Physics Letters, 2009, 95, .	3.3	98

#	Article	IF	Citations
19	Demonstration of ultra-small (<10 Î¼m) 632 nm red InGaN micro-LEDs with useful on-wafer external quantum efficiency (>0.2%) for mini-displays. Applied Physics Express, 2021, 14, 011004.	2.4	96
20	Revealing the importance of light extraction efficiency in InGaN/GaN microLEDs via chemical treatment and dielectric passivation. Applied Physics Letters, 2020, 116, .	3.3	94
21	Characterization of blue-green m-plane InGaN light emitting diodes. Applied Physics Letters, 2009, 94, 261108.	3.3	83
22	Luminescence spectra from InGaN multiquantum wells heavily doped with Si. Applied Physics Letters, 1998, 72, 3329-3331.	3.3	82
23	Free-standing, optically pumped, GaNâˆ•InGaN microdisk lasers fabricated by photoelectrochemical etching. Applied Physics Letters, 2004, 85, 5179-5181.	3.3	78
24	High optical polarization ratio from semipolar (202Â¯1Â¯) blue-green InGaN/GaN light-emitting diodes. Applied Physics Letters, 2011, 99, .	3.3	75
25	High luminous efficacy green light-emitting diodes with AlGaN cap layer. Optics Express, 2016, 24, 17868.	3.4	74
26	Polarized spontaneous emission from blue-green m-plane GaN-based light emitting diodes. Applied Physics Letters, 2011, 98, .	3.3	67
27	Low-threshold-current-density AlGaN-cladding-free m-plane InGaN/GaN laser diodes. Applied Physics Letters, 2010, 96, .	3.3	66
28	Silver free III-nitride flip chip light-emitting-diode with wall plug efficiency over 70% utilizing a GaN tunnel junction. Applied Physics Letters, 2016, 109, .	3.3	65
29	Unidirectional luminescence from InGaN/GaN quantum-well metasurfaces. Nature Photonics, 2020, 14, 543-548.	31.4	64
30	Atom probe analysis of interfacial abruptness and clustering within a single InxGa1âˆ’xN quantum well device on semipolar (101Â¯1Â¯) GaN substrate. Applied Physics Letters, 2011, 98, 191903.	3.3	59
31	444.9â€‰nm semipolar (112Â¯2) laser diode grown on an intentionally stress relaxed InGaN waveguiding layer. Applied Physics Letters, 2012, 100, .	3.3	59
32	Micro-light-emitting diodes with IIIâ€“nitride tunnel junction contacts grown by metalorganic chemical vapor deposition. Applied Physics Express, 2018, 11, 012102.	2.4	59
33	AlGaN Deep-Ultraviolet Light-Emitting Diodes Grown on SiC Substrates. ACS Photonics, 2020, 7, 554-561.	6.6	59
34	High-power low-droop violet semipolar (303Â¯1Â¯) InGaN/GaN light-emitting diodes with thick active layer design. Applied Physics Letters, 2014, 105, .	3.3	55
35	Higher efficiency InGaN laser diodes with an improved quantum well capping configuration. Applied Physics Letters, 2002, 81, 4275-4277.	3.3	50
36	Misfit dislocation formation via pre-existing threading dislocation glide in (112Â¯2) semipolar heteroepitaxy. Applied Physics Letters, 2011, 99, .	3.3	50

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37	Removal of thick (>100nm) InGaN layers for optical devices using band-gap-selective photoelectrochemical etching. Applied Physics Letters, 2004, 85, 762-764.	3.3	48
38	Visible resonant modes in GaN-based photonic crystal membrane cavities. Applied Physics Letters, 2006, 88, 031111.	3.3	48
39	Origin of pyramidal hillocks on GaN thin films grown on free-standing m-plane GaN substrates. Applied Physics Letters, 2010, 96, .	3.3	45
40	Unambiguous evidence of the existence of polarization field crossover in a semipolar InGaN/GaN single quantum well. Applied Physics Letters, 2009, 95, .	3.3	44
41	Determination of internal parameters for AlGaN-cladding-free m-plane InGaN/GaN laser diodes. Applied Physics Letters, 2011, 99, .	3.3	44
42	Color-tunable <10â€‰<i> Î¼ </i>m square InGaN micro-LEDs on compliant GaN-on-porous-GaN pseudo-substrates. Applied Physics Letters, 2020, 117, .	3.3	44
43	Carrier localization in m-plane InGaN/GaN quantum wells probed by scanning near field optical spectroscopy. Applied Physics Letters, 2010, 97, 151106.	3.3	40
44	Size-independent peak external quantum efficiency (>2%) of InGaN red micro-light-emitting diodes with an emission wavelength over 600â€‰nm. Applied Physics Letters, 2021, 119, .	3.3	39
45	Growth of strain-relaxed InGaN on micrometer-sized patterned compliant GaN pseudo-substrates. Applied Physics Letters, 2020, 116, .	3.3	38
46	Indium segregation in N-polar InGaN quantum wells evidenced by energy dispersive X-ray spectroscopy and atom probe tomography. Applied Physics Letters, 2017, 110, .	3.3	34
47	Polarization field screening in thick (0001) InGaN/GaN single quantum well light-emitting diodes. Applied Physics Letters, 2016, 108, .	3.3	33
48	Demonstration of GaN-based vertical-cavity surface-emitting lasers with buried tunnel junction contacts. Optics Express, 2019, 27, 31621.	3.4	33
49	Red InGaN micro-light-emitting diodes (>620â€‰nm) with a peak external quantum efficiency of 4.5% using an epitaxial tunnel junction contact. Applied Physics Letters, 2022, 120, .	3.3	33
50	Stress relaxation and critical thickness for misfit dislocation formation in (101Â¯0) and (3031Â¯) InGaN/GaN heteroepitaxy. Applied Physics Letters, 2012, 100, 171917.	3.3	32
51	Demonstration of relaxed InGaN-based red LEDs grown with high active region temperature. Applied Physics Express, 2021, 14, 101002.	2.4	32
52	Luminescence Characteristics of N-Polar GaN and InGaN Films Grown by Metal Organic Chemical Vapor Deposition. Japanese Journal of Applied Physics, 2009, 48, 071003.	1.5	31
53	Light-emitting metalenses and meta-axicons for focusing and beaming of spontaneous emission. Nature Communications, 2021, 12, 3591.	12.8	31
54	Growth of highly relaxed InGaN pseudo-substrates over full 2-in. wafers. Applied Physics Letters, 2021, 119, .	3.3	31

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55	High-power blue-violet AlGaN-cladding-free m-plane InGaN/GaN laser diodes. Applied Physics Letters, 2011, 99, .	3.3	30
56	InGaN-Based microLED Devices Approaching 1% EQE with Red 609 nm Electroluminescence on Semi-Relaxed Substrates. Crystals, 2021, 11, 1364.	2.2	30
57	Comparative study of field-dependent carrier dynamics and emission kinetics of InGaN/GaN light-emitting diodes grown on (112Â¯2) semipolar versus (0001) polar planes. Applied Physics Letters, 2014, 104, .	3.3	29
58	Determination of polarization field in a semipolar (112Â¯2)â€ˆInGaâ€•GaN single quantum well using Franzâ€“Keldysh oscillations in electroreflectance. Applied Physics Letters, 2009, 94, .	3.3	27
59	Dynamics of polarized photoluminescence in m-plane InGaN/GaN quantum wells. Journal of Applied Physics, 2010, 108, 023101.	2.5	27
60	Suppressing void defects in long wavelength semipolar (202Â¯1Â¯) InGaN quantum wells by growth rate optimization. Applied Physics Letters, 2013, 102, .	3.3	26
61	Semipolar IIIâ€“nitride light-emitting diodes with negligible efficiency droop up to â¼1 W. Applied Physics Express, 2016, 9, 102102.	2.4	26
62	Size-independent low voltage of InGaN micro-light-emitting diodes with epitaxial tunnel junctions using selective area growth by metalorganic chemical vapor deposition. Optics Express, 2020, 28, 18707.	3.4	26
63	Metalorganic chemical vapor deposition grown n-InGaN/n-GaN tunnel junctions for micro-light-emitting diodes with very low forward voltage. Semiconductor Science and Technology, 2020, 35, 125023.	2.0	23
64	Progress of InGaN-Based Red Micro-Light Emitting Diodes. Crystals, 2022, 12, 541.	2.2	23
65	Compliant Micron-Sized Patterned InGaN Pseudo-Substrates Utilizing Porous GaN. Materials, 2020, 13, 213.	2.9	22
66	Geometrical Characteristics and Surface Polarity of Inclined Crystallographic Planes of the Wurtzite and Zincblende Structures. Journal of Electronic Materials, 2009, 38, 756-760.	2.2	21
67	High-temperature electroluminescence properties of InGaN red 40â€‰Ã—â€‰40 Î¼ m2 micro-light-emitting diodes with a peak external quantum efficiency of 3.2%. Applied Physics Letters, 2021, 119, .	3.3	21
68	m-plane pure blue laser diodes with p-GaN/n-AlGaN-based asymmetric cladding and InGaN-based wave-guiding layers. Applied Physics Letters, 2009, 95, 081110.	3.3	20
69	Metal-organic chemical vapor deposition of high quality, high indium composition N-polar InGaN layers for tunnel devices. Journal of Applied Physics, 2017, 121, 185707.	2.5	18
70	Demonstration of high efficiency cascaded blue and green micro-light-emitting diodes with independent junction control. Applied Physics Letters, 2021, 118, .	3.3	17
71	Assessment of deep level defects in m-plane GaN grown by metalorganic chemical vapor deposition. Applied Physics Letters, 2012, 100, .	3.3	16
72	Highâ€power LEDs using Gaâ€doped ZnO currentâ€spreading layers. Electronics Letters, 2016, 52, 304-306.	1.0	16

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73	Direct measurement of hot-carrier generation in a semiconductor barrier heterostructure: Identification of the dominant mechanism for thermal droop. Physical Review B, 2019, 100, .	3.2	16
74	Method of growing elastically relaxed crack-free AlGaN on GaN as substrates for ultra-wide bandgap devices using porous GaN. Applied Physics Letters, 2020, 117, .	3.3	15
75	Inhomogeneous Current Injection and Filamentary Lasing of Semipolar (2021Â¯) Blue GaNâ€Based Verticalâ€Cavity Surfaceâ€Emitting Lasers with Buried Tunnel Junctions. Physica Status Solidi (A) Applications and Materials Science, 2020, 217, 1900718.	1.8	14
76	Demonstration of high wall-plug efficiency III-nitride micro-light-emitting diodes with MOCVD-grown tunnel junction contacts using chemical treatments. Applied Physics Express, 2021, 14, 086502.	2.4	13
77	Demonstration of ultra-small 5 Ã— 5 Î¼m2 607â€‰nm InGaN amber micro-light-emitting diodes with an external quantum efficiency over 2%. Applied Physics Letters, 2022, 120, .	3.3	13
78	Intensity dependent time-resolved photoluminescence studies of GaN/AlGaN multiple quantum wells of varying well width on laterally overgrowna-plane and planarc-plane GaN. Physica Status Solidi (A) Applications and Materials Science, 2005, 202, 846-849.	1.8	11
79	Blue and aquamarine stress-relaxed semipolar (112Â¯2) laser diodes. Applied Physics Letters, 2013, 103, .	3.3	11
80	Morphological evolution of InGaN/GaN light-emitting diodes grown on free-standing m-plane GaN substrates. Journal of Applied Physics, 2013, 113, 063504.	2.5	11
81	Influence of growth temperature and temperature ramps on deep level defect incorporation in m-plane GaN. Applied Physics Letters, 2013, 103, 232108.	3.3	11
82	Investigation of Mg Î´-doping for low resistance N-polar p-GaN films grown at reduced temperatures by MOCVD. Semiconductor Science and Technology, 2018, 33, 095014.	2.0	11
83	Research Toward a Heterogeneously Integrated InGaN Laser on Silicon. Physica Status Solidi (A) Applications and Materials Science, 2020, 217, 1900770.	1.8	11
84	Room-Temperature Continuous-Wave Electrically Driven Semipolar (202Ì…1) Blue Laser Diodes Heteroepitaxially Grown on a Sapphire Substrate. ACS Photonics, 2020, 7, 1662-1666.	6.6	11
85	Reduction of efficiency droop in c-plane InGaN/GaN light-emitting diodes using a thick single quantum well with doped barriers. Applied Physics Letters, 2021, 119, .	3.3	10
86	Recent progress in nonpolar LEDs as polarized light emitters. Physica Status Solidi (A) Applications and Materials Science, 2009, 206, 203-205.	1.8	9
87	Photoluminescence and positron annihilation studies on Mg-doped nitrogen-polarity semipolar (101Â¯1Â¯) GaN heteroepitaxial layers grown by metalorganic vapor phase epitaxy. Applied Physics Letters, 2010, 96, 091913.	3.3	9
88	Properties of N-polar InGaN/GaN quantum wells grown with triethyl gallium and triethyl indium as precursors. Semiconductor Science and Technology, 2019, 34, 075017.	2.0	9
89	Metalorganic chemical vapor deposition-grown tunnel junctions for low forward voltage InGaN light-emitting diodes: epitaxy optimization and light extraction simulation. Semiconductor Science and Technology, 2021, 36, 035019.	2.0	9
90	Fully transparent metal organic chemical vapor deposition-grown cascaded InGaN micro-light-emitting diodes with independent junction control. Optics Express, 2021, 29, 22001.	3.4	9

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91	Patterned IIIâ€Nitrides on Porous GaN: Extending Elastic Relaxation from the Nanoâ€•to the Micrometer Scale. Physica Status Solidi - Rapid Research Letters, 2021, 15, 2100234.	2.4	9
92	Low Forward Voltage III-Nitride Red Micro-Light-Emitting Diodes on a Strain Relaxed Template with an InGaN Decomposition Layer. Crystals, 2022, 12, 721.	2.2	9
93	Improved Vertical Carrier Transport for Green III-Nitride LEDs Using <mml:math xmlns:mml="http://www.w3.org/1998/Math/MathML" display="inline" overflow="scroll"><mml:mo stretchy="false">(</mml:mo><mml:mi>In</mml:mi><mml:mo>,</mml:mo><mml:mi>Ga</mml:mi><mml:mo) Tj ETQq1 1 0.784314 rgBT mathvariant="normal">N</mml:mi></mml:mrow></mml:mrow></mml:math> Alloy Quantum Barriers. Physical Review Applied, 2022, 17, .	3.8	9
94	Dichromatic color tuning with InGaN-based light-emitting diodes. Applied Physics Letters, 2008, 93, 121112.	3.3	8
95	Violet semipolar (20-2-1) InGaN microcavity light-emitting diode with a 200â€…nm ultra-short cavity length. Optics Express, 2020, 28, 29991.	3.4	8
96	The Dawn of Miniature Green Lasers. Scientific American, 2009, 300, 70-75.	1.0	7
97	Blue InGaN/GaN laser diodes grown on (33$ ar 3 ar 1 $) freeâ€standing GaN substrates. Physica Status Solidi C: Current Topics in Solid State Physics, 2011, 8, 2390-2392.	0.8	7
98	CW operation of highâ€power blue laser diodes with polished facets on semiâ€polar GaN substrates. Electronics Letters, 2016, 52, 2003-2005.	1.0	7
99	MOCVD Growth and Characterization of InN Quantum Dots. Physica Status Solidi (B): Basic Research, 2020, 257, 1900508.	1.5	7
100	Flow modulation metalorganic vapor phase epitaxy of GaN at temperatures below 600 Â°C. Semiconductor Science and Technology, 2020, 35, 095014.	2.0	7
101	Effects of activation method and temperature to III-nitride micro-light-emitting diodes with tunnel junction contacts grown by metalorganic chemical vapor deposition. Applied Physics Letters, 2021, 119, .	3.3	7
102	Improved quality nonpolar <i>a</i> â€plane GaN/AlGaN UV LEDs grown with sidewall lateral epitaxial overgrowth (SLEO). Physica Status Solidi (A) Applications and Materials Science, 2008, 205, 1705-1712.	1.8	6
103	Comparison of Polished and Dry Etched Semipolar $(11ar{2}2)$ III-Nitride Laser Facets. IEEE Photonics Technology Letters, 2013, 25, 2105-2107.	2.5	6
104	2DEGs formed in AlN/GaN HEMT structures with AlN grown at low temperature. Applied Physics Letters, 2021, 118, .	3.3	6
105	Realization of III-Nitride c-Plane microLEDs Emitting from 470 to 645 nm on Semi-Relaxed Substrates Enabled by V-Defect-Free Base Layers. Crystals, 2021, 11, 1168.	2.2	6
106	Polarization field crossover in semiâ€polar InGaN/GaN single quantum wells. Physica Status Solidi C: Current Topics in Solid State Physics, 2010, 7, 2378-2381.	0.8	5
107	2.6 GHz high-speed visible light communication of 450 nm GaN laser diode by direct modulation. , 2015, , .		5
108	High speed performance of III-nitride laser diode grown on (2021) semipolar plane for visible light communication. , 2016, , .		4

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109	Transmission Geometry Laser Lighting with a Compact Emitter. Physica Status Solidi (A) Applications and Materials Science, 2020, 217, 2000391.	1.8	4
110	InGaN/GaN laser diodes on semipolar (10) bulk GaN substrates. Physica Status Solidi C: Current Topics in Solid State Physics, 2008, 5, 2108-2110.	0.8	3
111	Effects of Growth Temperature and Postgrowth Annealing on Inhomogeneous Luminescence Characteristics of Green-Emitting InGaN Films. Journal of Electronic Materials, 2010, 39, 15-20.	2.2	3
112	Gallium nitride based light emitting diodes (LEDs) for energy efficient lighting and displays. , 2013, , .		3
113	Optoelectronic properties of doped hydrothermal ZnO thin films. Physica Status Solidi (A) Applications and Materials Science, 2017, 214, 1600941.	1.8	3
114	Enhanced external quantum efficiency of III-nitride micro-light-emitting diodes using vertical and transparent package. Japanese Journal of Applied Physics, 2021, 60, 020905.	1.5	3
115	High efficiency blue InGaN microcavity light-emitting diode with a 205â€‰nm ultra-short cavity. Applied Physics Letters, 2021, 118, 031102.	3.3	3
116	Green edge emitting lasers with porous GaN cladding. Optics Express, 2022, 30, 27674.	3.4	3
117	Designing Highly Directional Luminescent Phased-Array Metasurfaces with Reciprocity-Based Simulations. ACS Omega, 2022, 7, 22477-22483.	3.5	3
118	Effect of nâ€AlGaN cleave assistance layers on the morphology of c â€plane cleaved facets for m â€plane InGaN/GaN laser diodes. Physica Status Solidi C: Current Topics in Solid State Physics, 2011, 8, 2226-2228.	0.8	2
119	2.6 GHz high-speed visible light communication of 450 nm GaN laser diode by direct modulation. , 2015, , .		2
120	Estimation of roughness-induced scattering losses in III-nitride laser diodes with a photoelectrochemically etched current aperture. Physica Status Solidi (A) Applications and Materials Science, 2016, 213, 953-957.	1.8	2
121	Properties of AlN/GaN Heterostructures Grown at Low Growth Temperatures with Ammonia and Dimethylhydrazine. Crystals, 2021, 11, 1412.	2.2	2
122	Inverted N-polar blue and blue-green light emitting diodes with high power grown by metalorganic chemical vapor deposition. Applied Physics Letters, 2022, 120, 101104.	3.3	2
123	A semipolar (10-1-3) InGaN/GaN green light emitting diode. Materials Research Society Symposia Proceedings, 2005, 892, 418.	0.1	1
124	GaN-based VCSEL fabricated on nonpolar GaN substrates. , 2013, , .		1
125	Hybrid MOCVD/MBE GaN tunnel junction LEDs with greater than 70% wall plug efficiency. , 2016, , .		1
126	High-speed performance of III-nitride 410 nm ridge laser diode on (202Ì„1Ì„) plane for visible light communication. , 2016, , .		1

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127	Nonpolar GaN-based vertical-cavity surface-emitting lasers. , 2017, , .		1
128	Optical Gain and Loss Measurements of Semipolar III-nitride Laser Diodes with ITO/thin-p-GaN Cladding Layers. , 2018, , .		1
129	Growth and characterization of semipolar InGaN/GaN multiple quantum wells and light-emitting diodes on (10 11) GaN templates. Materials Research Society Symposia Proceedings, 2005, 892, 127.	0.1	0
130	GaN-based solid state lighting. , 2008, , .		0
131	Time-resolved optical studies of InGaN LED structures grown on semipolar and nonpolar bulk GaN substrates. , 2008, , .		0
132	63.4: Invited Paper: Development and Application Prospects of InGaNâ€based Optoelectronic Devices Prepared in Nonpolar Orientations. Digest of Technical Papers SID International Symposium, 2008, 39, 969-971.	0.3	0
133	Heterogeneous integration of InGaN and Silicon solar cells for enhanced energy harvesting. , 2012, , .		0
134	Latest performance of GaN-based nonpolar/semipolar emitting devices. , 2012, , .		0
135	Enhancing light extraction from III-nitride devices using moth-eye nanostructures formed by colloidal lithography. , 2016, , .		0
136	Development of c-plane thin-film flip-chip LEDs fabricated by photoelectrochemical (PEC) liftoff. , 2016, , .		0
137	Estimation of roughness-induced scattering losses in III-nitride laser diodes with a photoelectrochemically etched current aperture (Phys. Status Solidi A 4âˆ•2016). Physica Status Solidi (A) Applications and Materials Science, 2016, 213, 1096-1096.	1.8	0
138	Designs for III-nitride edge-emitting laser diodes with tunnel junction contacts for low internal optical absorption loss. Optical Engineering, 2022, 61, .	1.0	0