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XRD Characterization of GaN(0002) on Si(111) films Grown by RF-MBE

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Characterization of GaN on Si (GoS) films grown on G-DBL by RF-MBE

Low cost **GoS** using **RF-MBE**



G-DBL :

Growth graded Double buffer Layer(G-DBL)
GaN/AlGaN/AlN/ β -Si₃N₄/Si(111)



② Graded composition AlGaN growth
(**Activity Modulation(AM) MEE**)

G-DBR

③ GaN growth by AM-MEE



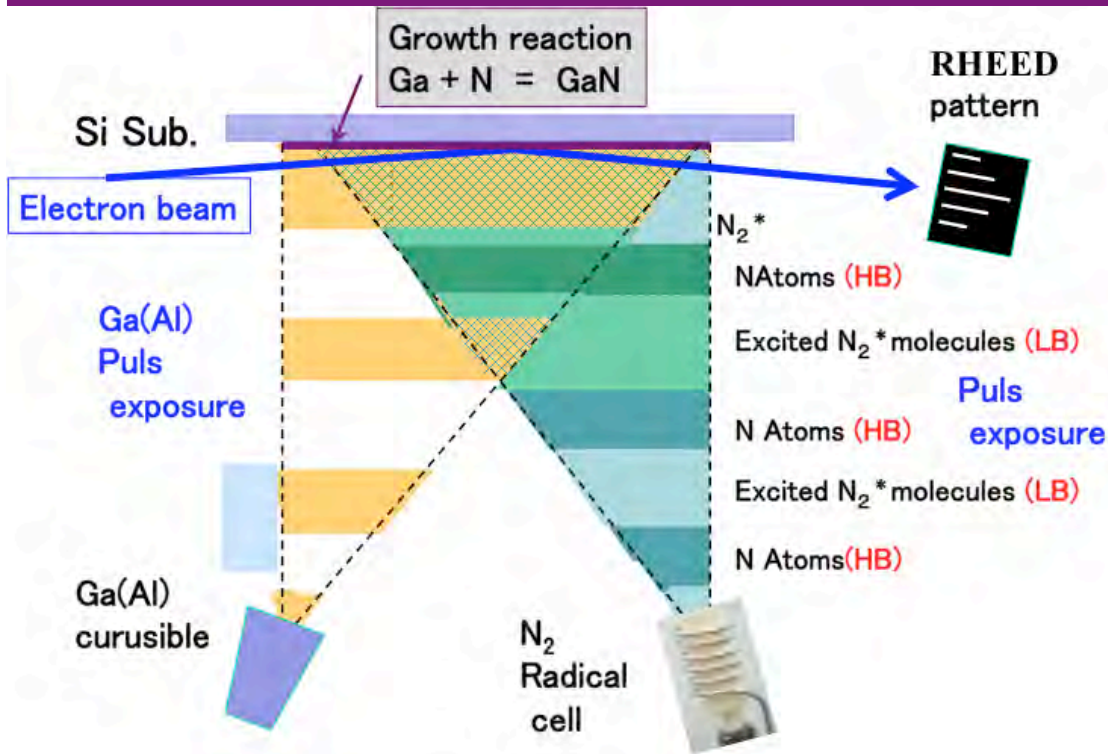
**AM-MEE (Activity modulation
migration enhancement epitaxy):**

AM-MEE growth of GaN on Si

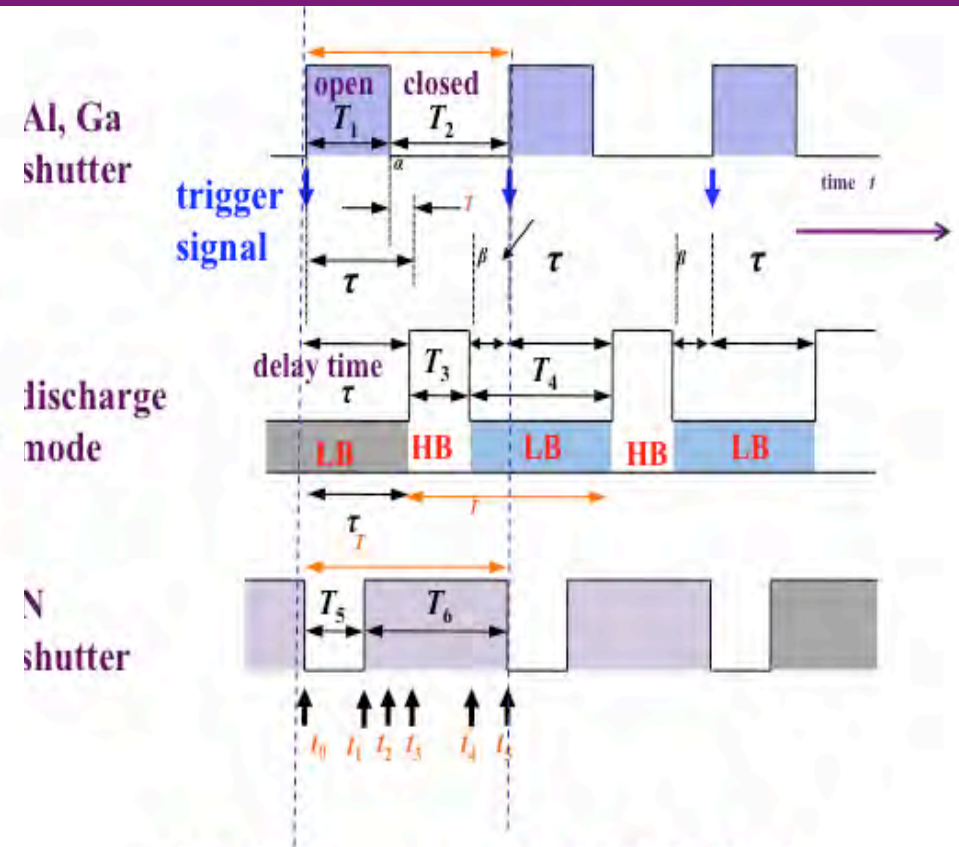
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(a) AM-MEE RF-MBE



(b) Sequence of AM-MEE

Samples

	[nm]		
	g033	g404	f145
GaN	90	43	191
AlN or AlGaIn	36		
Si(111)		40	46

Wide range $2\theta - \omega$ XRD

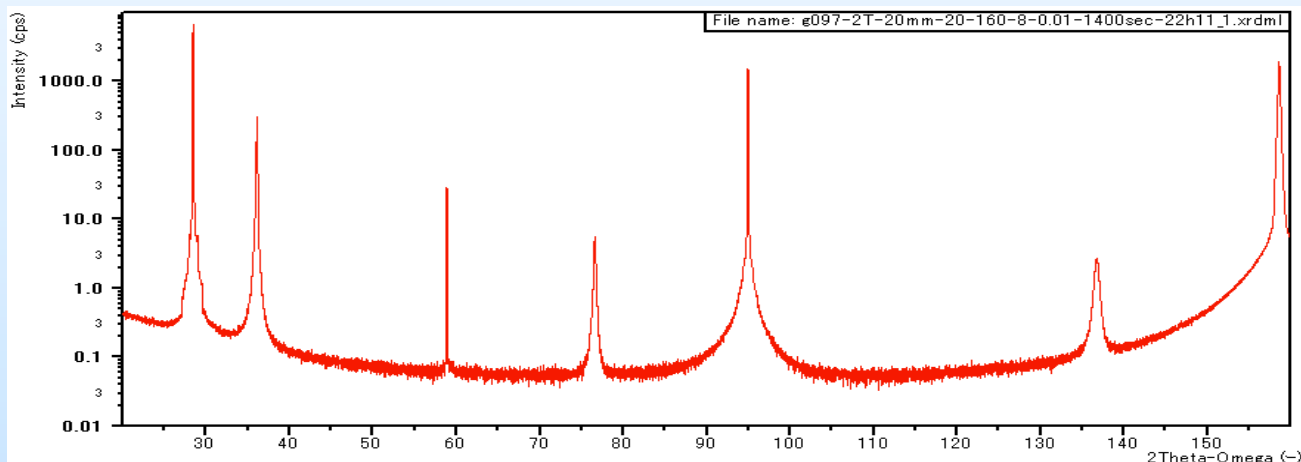
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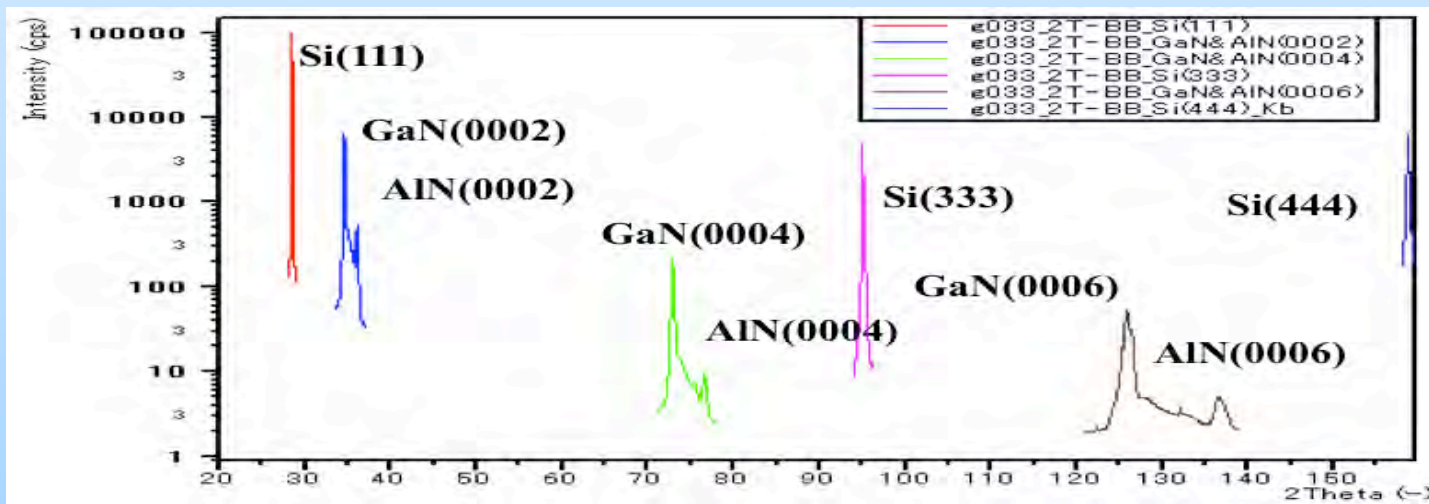
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$2\theta : 20 \sim 160^\circ$

AlN



g033

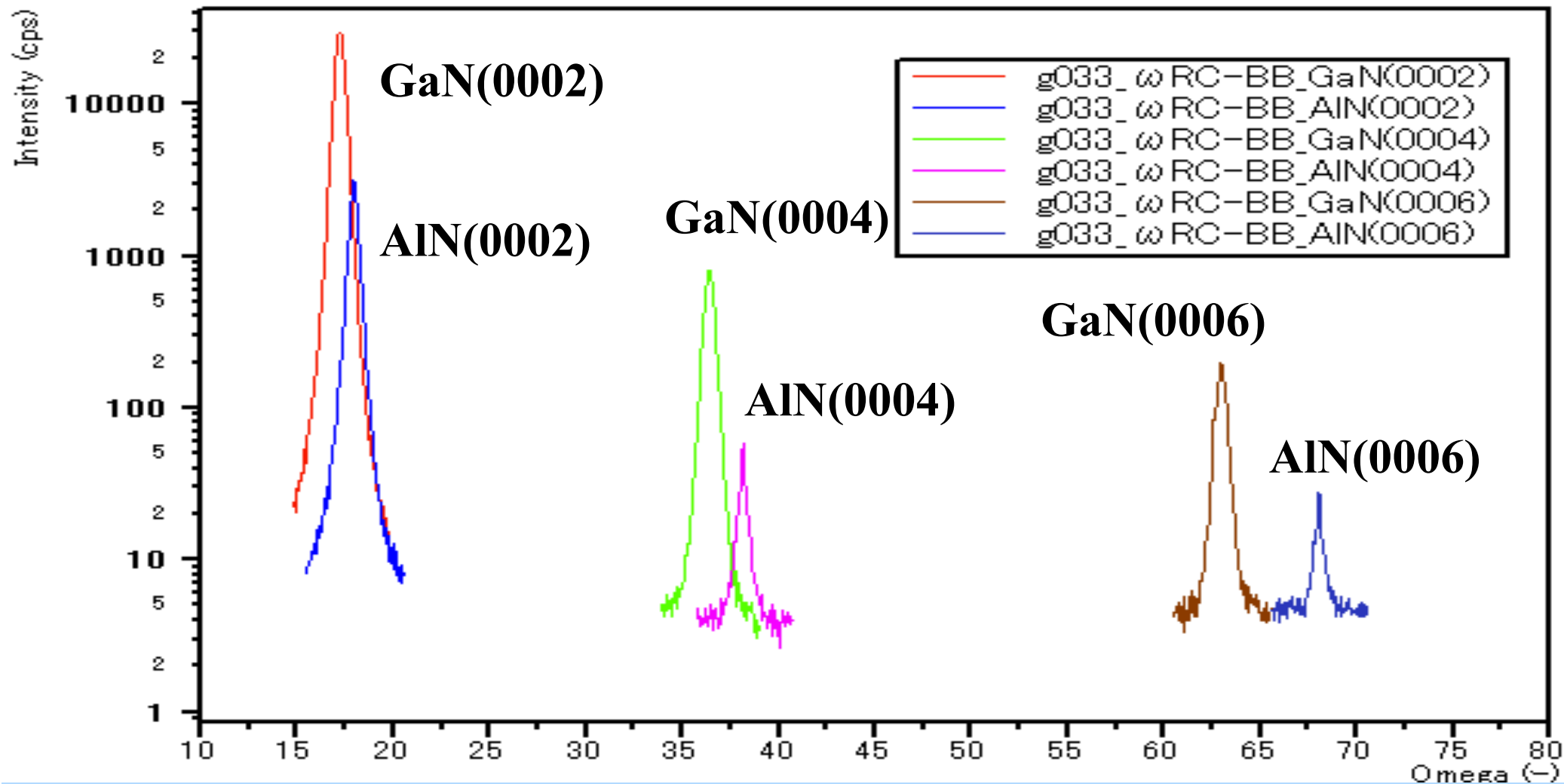


ω Rocking Curves g033

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FWHM measured for GoS films

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g033 Graded buffer

	GaN(0002)	AlN(0002)	GaN(0004)	AlN(0004)	GaN(0006)	AlN(0006)
ω	0.56	0.461	0.573	0.241	0.554	0.166
2θ	0.177	0.251	0.358	0.421	0.918	1.303

g404

	GaN(0002)	AlN(0002)	GaN(0004)	AlN(0004)	GaN(0006)	AlN(0006)
ω	0.857	0.698	0.855	0.567	0.882	0.403
2θ	0.281	0.232	0.511	0.47		1.1

f145

	GaN(0002)	AlN(0002)	GaN(0004)	AlN(0004)	GaN(0006)	AlN(0006)
ω	0.322	0.364	0.348	0.347	0.345	0.292
2θ	0.091	0.239	0.159	0.377	0.412	

	g033	g404	f145
GaN	90	43	191
AlGaIn	36		
AlN		40	46

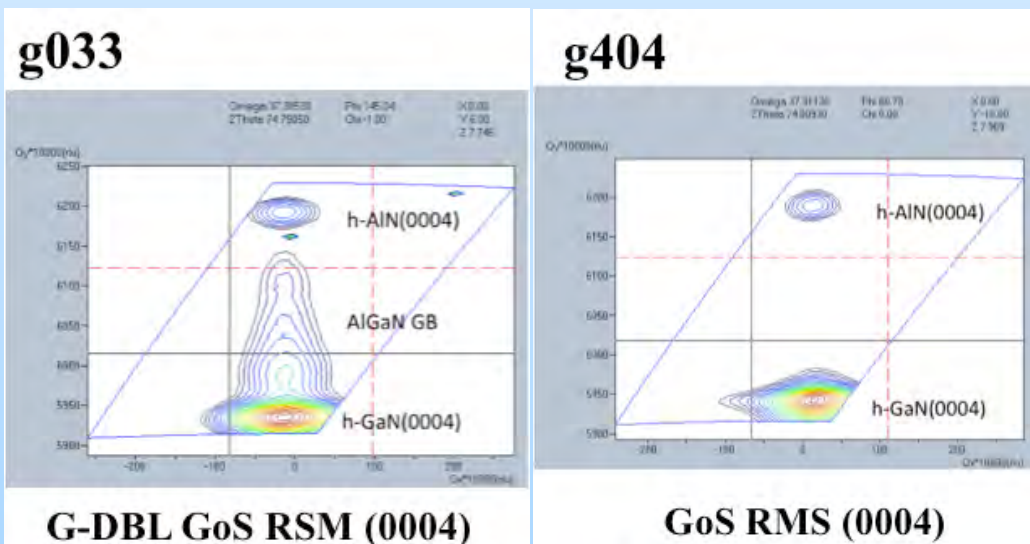
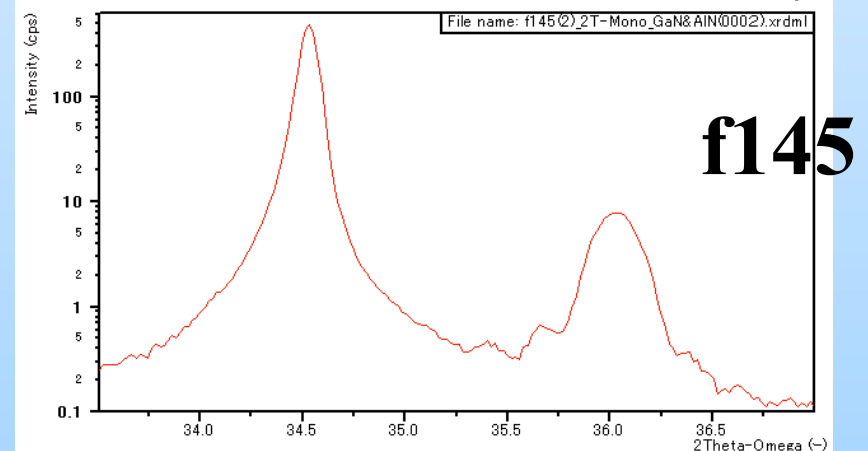
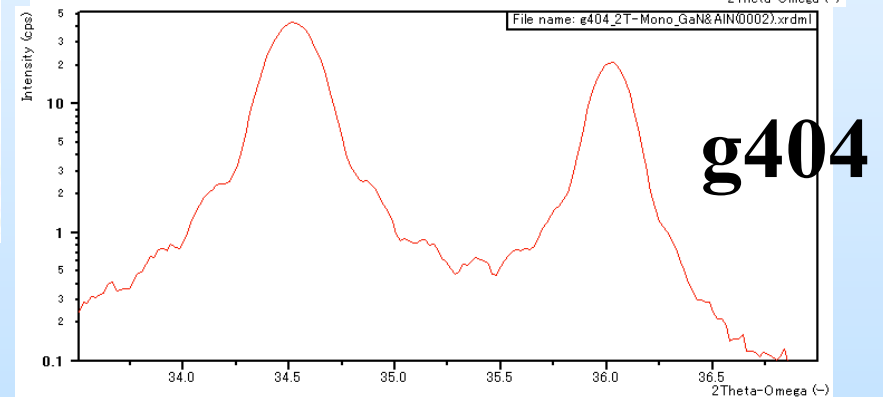
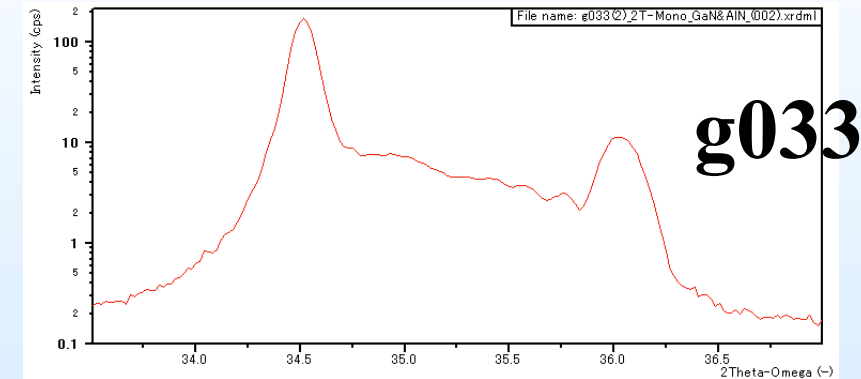
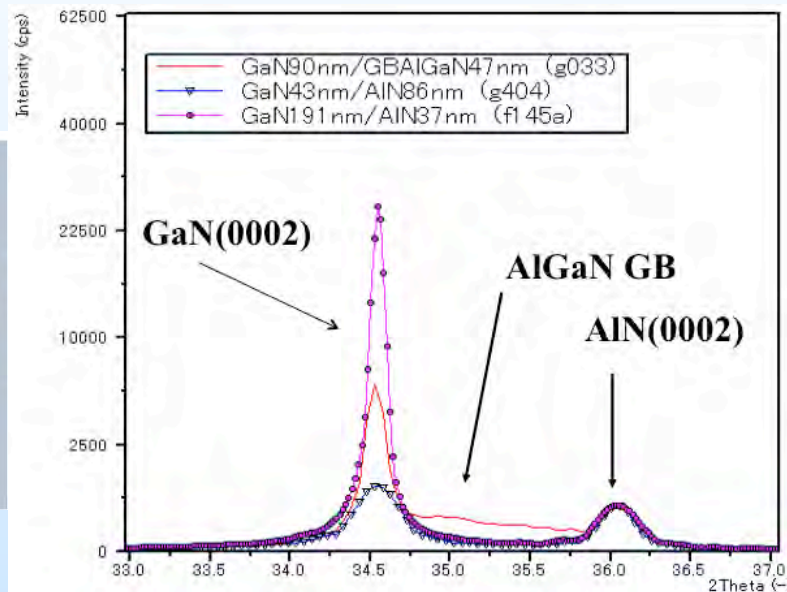
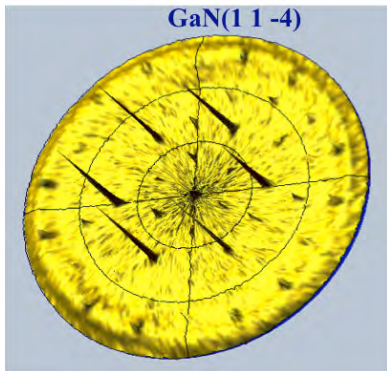
[nm]

$2\theta - \omega$ XRD, RSM and Pole figure

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Growth of GaN on Si (GoS)

- Graded double buffer layer,
GaN/AlGaN/AlN/ β Si₃N₄/Si,
was effectively operated to reduce FWHM.
- AM-MEE Growth under Ga excess condition
will help to reduce FWHM.