Bede REFS 4 Report

SUMMARY

Company: Bede Scientific Incorporated, USA

Equipment:

Operator: Matthew Wormington

Lot:

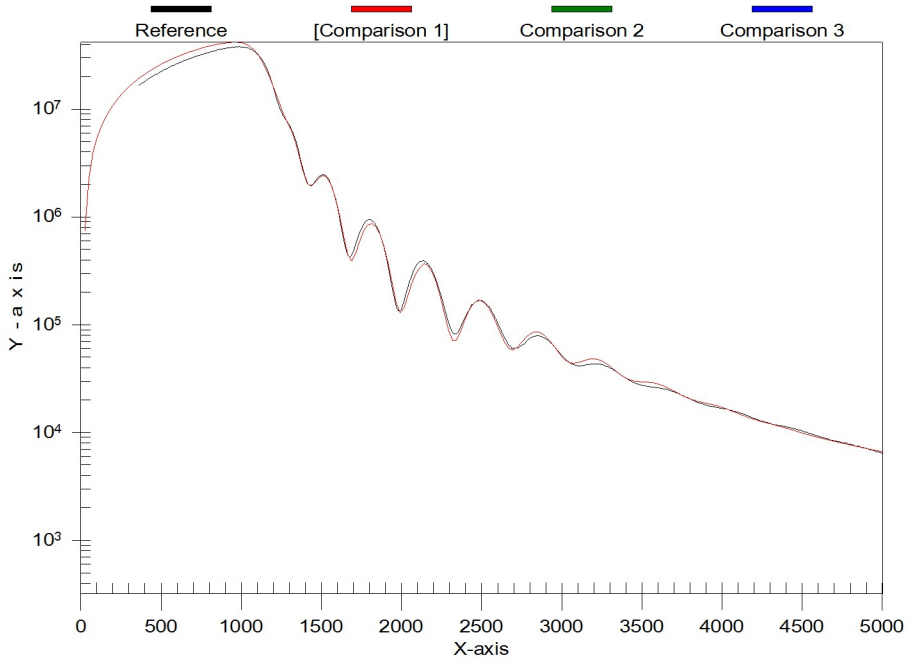
Carrier:

Substrate:

Site:

Comments: Bede REFS example file: Ta layer atop Al2O3 substrate. The specular X-ray reflectivity were measured using CuKa radiation.

Description: Specular X-ray reflectivity scan assuming 1.541 Å radiation. The incident and background intensities are 452996019 cps and 62.47 cps, respectively. The sample angle (Omega) starts at 0 sec, and finishes at 10004.4 sec with a step-size of 25.2 sec. Simultaneously, the detector angle (2Theta) starts at 0 sec and finishes at 20008.8 sec with a step-size of 50.4 sec.



FILES

Model: C:\Users\User\Dropbox\Labchem\Èññëäîâàíèå ALD TiN\2018 Ãîñçàäàíèå\XR

Reference: C:\Users\User\Dropbox\Labchem\Èññëäîâàíèå ALD TiN\2018 Ãîñçàäàíèå\XR

Comparison 1:

Comparison 2:

Comparison 3:

Goodness-of-fit:

ID	THICKNESS (Å)	MATERIAL	X	Y	DENSITY (%)	ROUGHNESS (Å)	GRADING (Å)	LAMELLAE	PERIODS
SUB.	¥	Si	0.000	0.000	100.00	2.50	0.00	1	
1	33.46	SiO2	0.000	0.000	81.24	2.89	0.00	1	
2	392.64	TiN	0.000	0.000	92.14	21.00	0.00	1	

EQUIPMENT

Incident Beam

Width:	1.1 mm
Height:	16 mm
Divergence:	80 sec

Detector Slits

Width:	12 mm
Height:	16 mm
Distance to sample:	26 cm
Acceptance:	9518.2 sec
Include Equipment Function:	þ

MEASUREMENT

Scan Type:	Specular
Wavelength:	1.541 Å
Intensity:	452996019 cps
Background:	62.47 cps

Sample (w) Axis

Start:	0 sec
Finish:	10004.4 sec
Step:	25.2 sec

Detector (2q) Axis

Start:	0 sec
Finish:	20008.8 sec
Step:	50.4 sec
Data points =	398

SAMPLE

Advanced Roughness

Roughness model:	Uncorrelated Interfaces
Correlation length:	10000 Å
Fractal exponent:	1
Miscut angle	0 deg

Dimensions

Length:	30 mm
Width:	26 mm
Radius of curvature:	290 m

OPTIONS

Units

Angle units:	Seconds
Length units:	Ångstroms
Output units:	Real Space

Diffuse Scans

Include specular intensity:	þ
Use C(r) instead of exp[C(r)-1]:	o
Use modified Born approximation:	o

DATA-FITTING

Strategy:	DE/rand/1/bin
Population size:	30
Crossover factor:	0.5
Mutation factor:	0.7
GOF function:	MAE (log10)

Complete When

þ**Iterations =**	5000
o**Generations =**	1000
o**Elapsed time (s) =**	600
o**GOF function <=**	0