

(19) (KR)
(12) (A)

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(21) 10-2003-7003355
(22) 2003 03 06
 2003 03 06
(86) PCT/US2001/27657 (87) WO 2002/21075
(86) 2001 09 05 (87) 2002 03 14

EA : , , , , , , , ,

EP : , , , , , , , , ,
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(30) 60/230,491 2000 09 06 (US)
09/946,104 2001 09 04 (US)

(71) 97701 131

(72) 87109 3817

87111 4431

(74)

(54)

(20)

(10)

6

9 6 가 60/230,491 (diffraction signature analysis) , 2000

,
(resist layer) (transmit) (. .) ,
(. .) ,
(. .) ,
(reduction lens) (illuminator),
(wafer stepper)↗
(step-and-repeat) (step-and-scan)
,

(SEM)	SEM	0.1	(feature)	(resolve)
가	-	-	-	-

(a) Overlay error vs. wavelength (nm) for target SEM data. The plot shows a single curve peaking around 5,952,132 nm.

(b) Overlay error vs. wavelength (nm) for CD data. The plot shows a single curve peaking around 5,703,692 nm.

(c) Overlay error vs. wavelength (nm) for specular order and properties. The plot shows two curves: one for specular order (blue circles) and one for properties (red squares).

(d) Overlay error vs. wavelength (nm) for S and P polarizations. The plot shows two curves: one for S polarization (green triangles) and one for P polarization (magenta diamonds).

(e) Overlay error vs. wavelength (nm) for X-ray and non-light-based methods. The plot shows two curves: one for X-ray (cyan crosses) and one for non-light-based (orange pluses).

2

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(metric)

(metric)

가

3

가

가

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(fitting)

(radiation source-based)

S P

74

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, SEM

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5a-5c S P

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7a 7b ,

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SEM

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(softbake)

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X Y

(X (25) Y)

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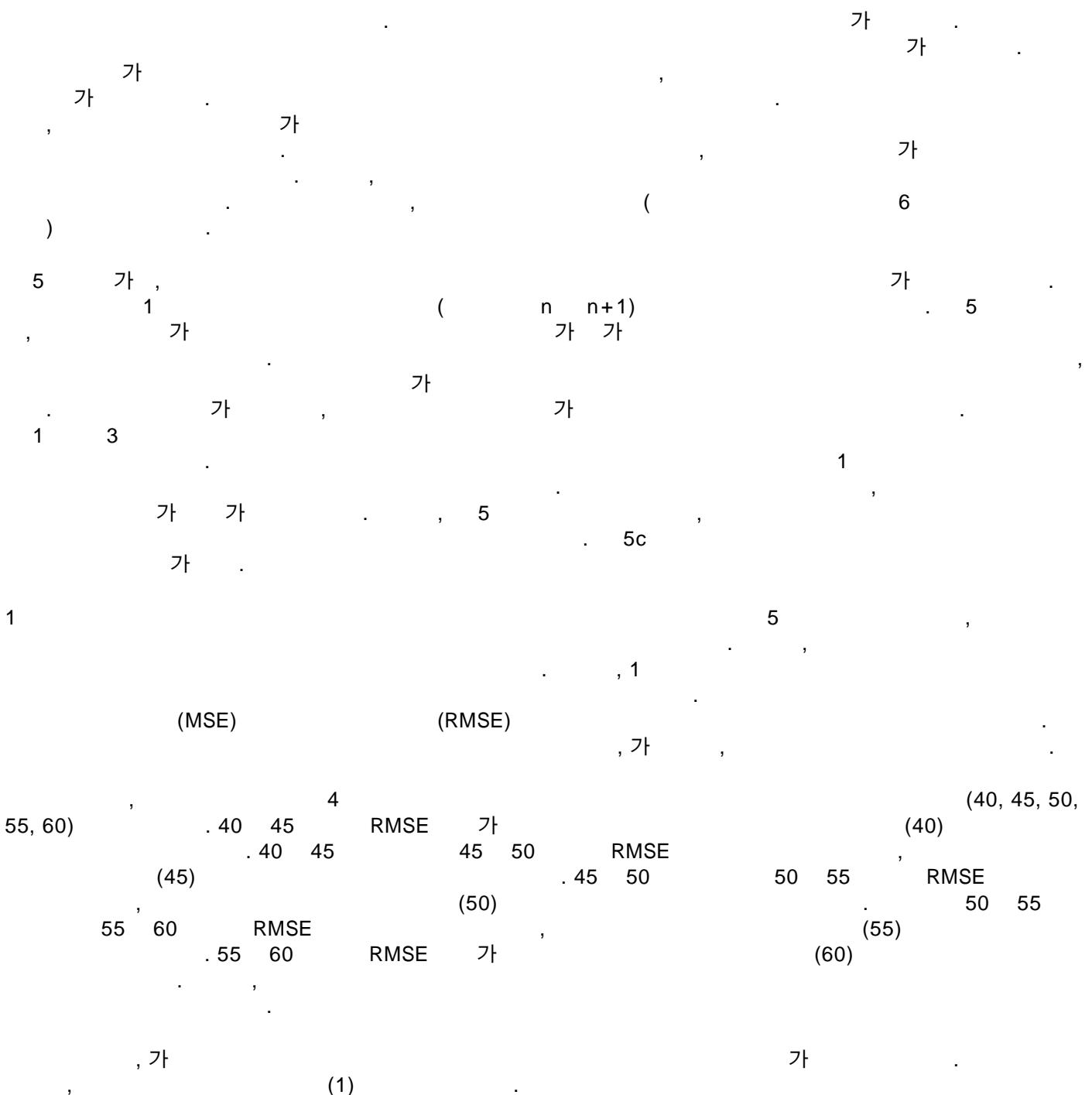
가 3

00nm

400nm

1:1 1:3

1:3 1



$$\text{COF} = \frac{\sum_{i=1}^n \frac{(\text{Focus Step})}{(\text{DSD}_{\text{RMSE}})^2}}{\sum_{i=1}^n \frac{1}{(\text{DSD}_{\text{RMSE}})^2}}$$

, COF DSD RMSE RMSE (DSD)

(outlier)

가

7a

(robustness)

가

7b

가

가

가

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가 가

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5 가

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(S P

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X-
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(1)

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0.03

, 0.07

(20)

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가

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가

, 9

, x y
(stage tilt effect)

가

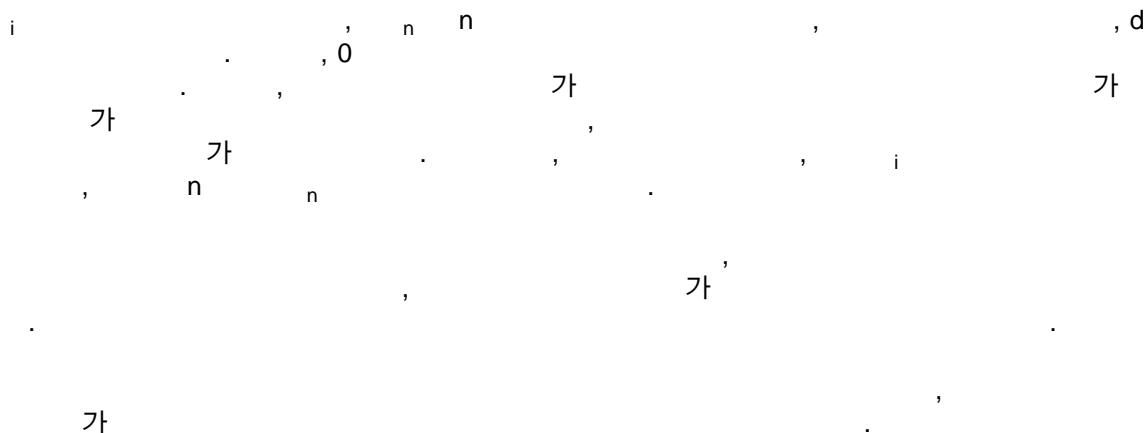
)

(

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(2)

$$\sin\Theta_i + \sin\Theta_n = n\lambda/d^{\textcolor{red}{2}}$$



(57)

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b) , 가 () 가 () ;
c)

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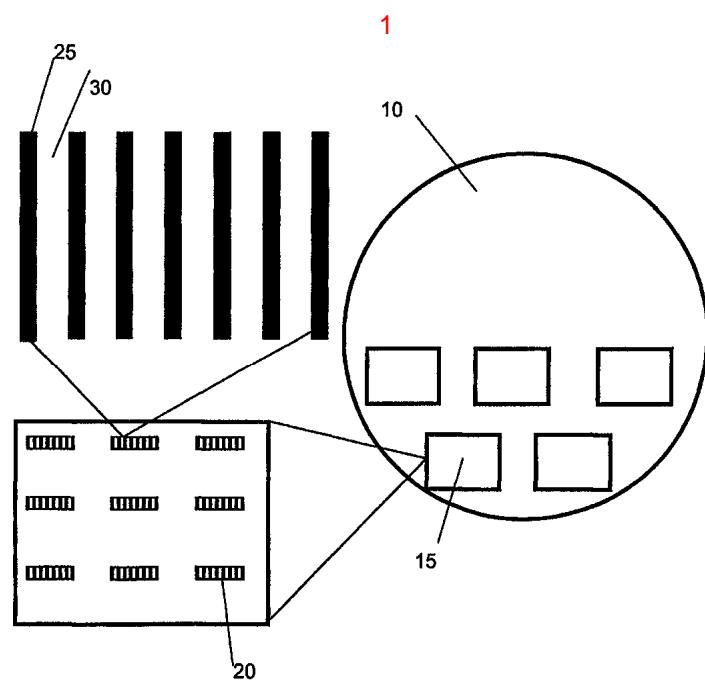
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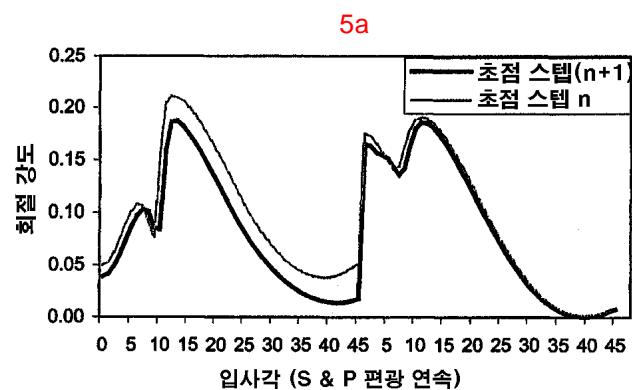
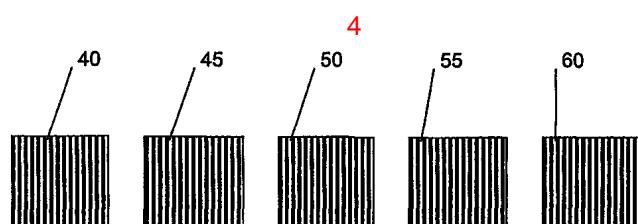
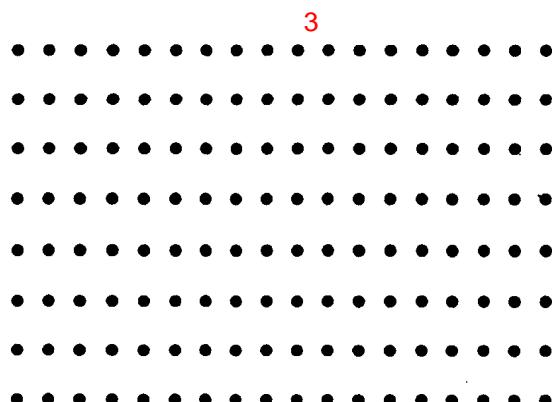
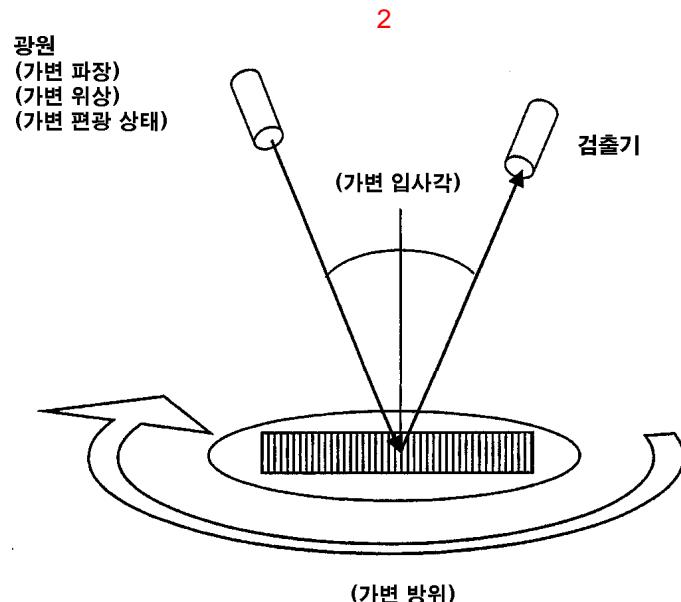
20.

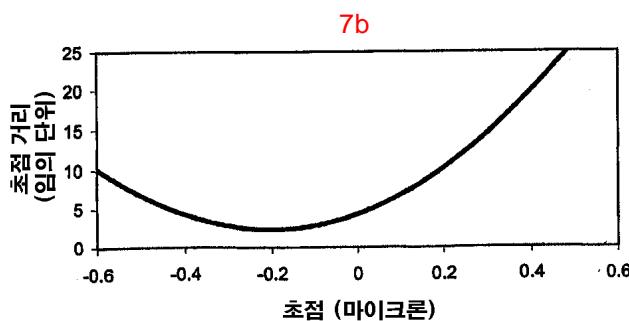
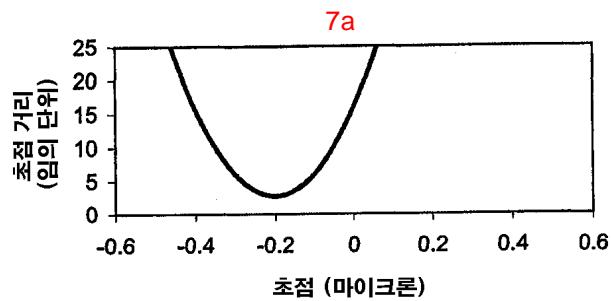
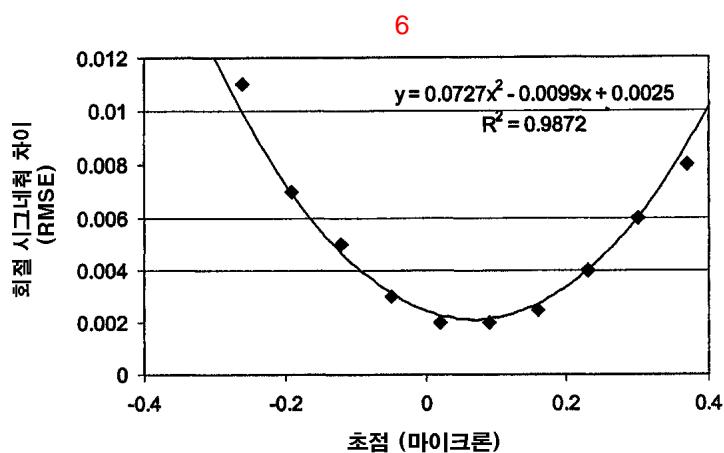
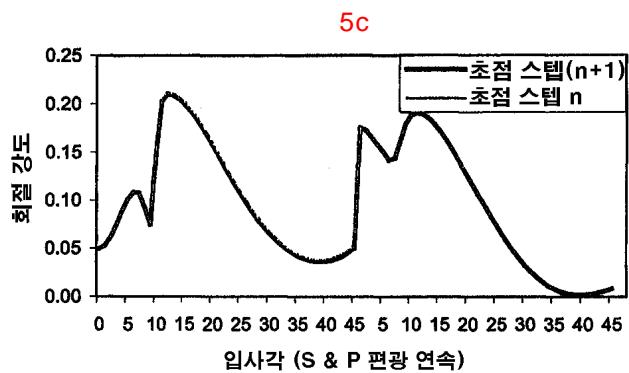
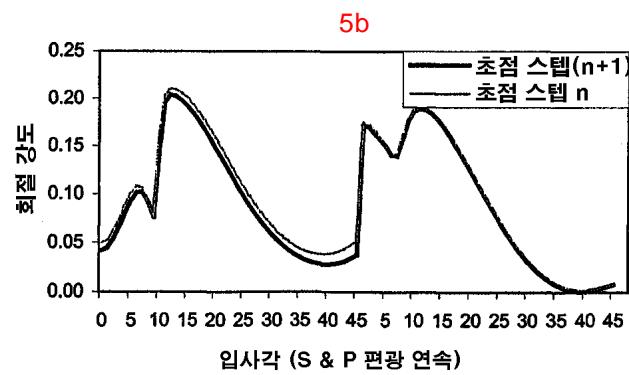
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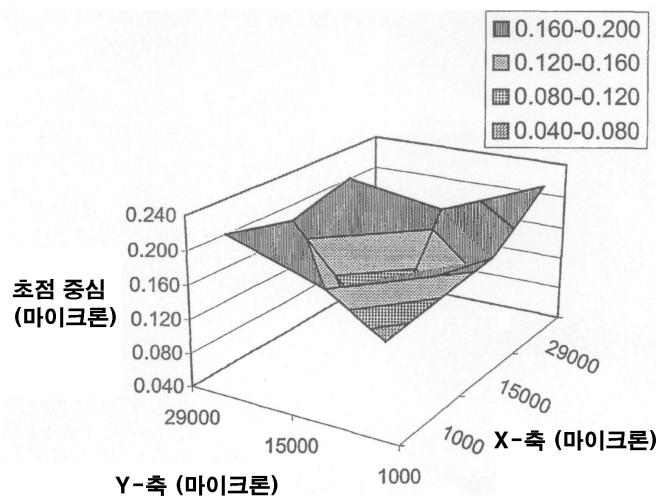
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