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š ± À î Ý S #. O3-TEOS-CVD †#Ý 8 S 0.35 # m P Â, 2A)/)•+w g B •/¡ High Quality Dielectric Film for 0.35 - #m Design Rule Application by O3 -TEOS-CVD Using Ethanol Pretreatment

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¸ º Û š ³ Ý œ Ý ¯ © Ü £ î º(TEOS) \ œ ° å † N q ž « _#Ý 8 S © Ü ¥ å4ß ì+w b – }
ì Û ¼%& B6× 2(APCVD) _ > 8 Z>* © Ü ¥ å4ß ì+w g B S _ , K 8 W … ö È #. † • < •
G \ _ | ~>* • j b 6 • W … b V _ © Ü ¥ å4ß ì+w † Ù3¸ ö | C>* ^ u } ? _ g B M • É
ß - « •/¡ †6ä$Î K S , © Ü ¥ å4ß ì+w ¹ ì 2 c>* © Ü ¥ å4ß ì+w B+w S b W … ö È
_>* š ± À î Ý † « Æ å ¥ î º 2 _ | ~ , x M • ‰ 2 [6 •>• G b W … ö È #. 2 _ | ~>*
' ¶ b W … #. 2 [c Y •+ ^ 0.3 # m œ [>*12 # m Ý I b A _ © Ü ¥ å4ß ì+w † Ù3¸ s>*
? X V8 c ¹ ^+w † g B M • G \ †0b 8 K S

Synopsis :
A new surface treatment, involving the spin coating of ethanol on a substrate prior to O3-tetraethylorthosilicate (TEOS) deposition by atmospheric pressure chemical vapor deposition (APCVD), was found to be very effective for improving gap -filling properties and film quality. The deposited film has a flow -like surface shape, and can be used to fill trenches of 0.3- Í P Z L G W K D Q G Í P G H S W K Z K L F K F R X O G Q R W E H I L O
O3-TEOS APCVD. The effects of surface treating by some other organic solvents are also reported and a possible mechanism is presented.

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エタノール前処理O_3-TEOS-CVDを用いた0.35μm対応良質絶縁膜形成技術*1

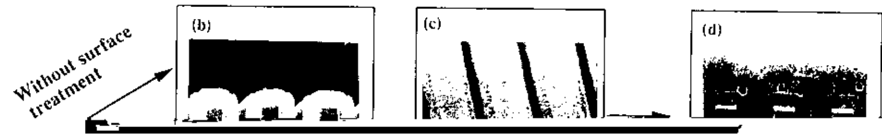
High Quality Dielectric Film for 0.35-μm Design Rule Application by O_3-TEOS-CVD Using Ethanol Pretreatment

要旨

テトラエチルオルソシリケート（TEOS）とオゾンを原料ガスに用いたシリコン酸化膜の常圧化学気相成長法（APCVD）において、シリコン酸化膜形成前に新しい下地基板処理を加えることにより、段差のある下地の上にシリコン酸化膜を埋込性よく、なめらか

2　実験

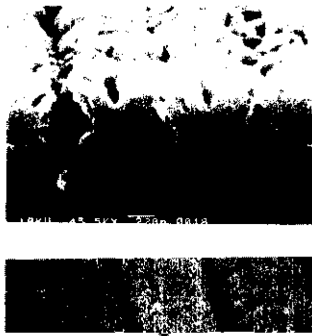
Temperature (℃)	413


Without surface treatment
(b)
(c)
(d)

	1	2	3
Non-treatment	(a)	(b)	(c)
With ethanol treatment	(d)	(e)	(f)
With NH_3 plasma treatment			(g)
	Deposition condition (Table 2)		

Photo 3 Dependence of the gap-filling properties and film quality of an O_3-TEOS SiO_2 films on the plasma-TEOS-SiO_2 film deposited under different conditions

(a) Non-treatment



は，トランジスタのゲート付近の第一層間絶縁膜とされる場合が予想できる。この場合は，電気的なダメージが懸念される下地シリコン酸化膜のプラズマの下地処理採用は困難であり，このことからも，ダメージフリーであるエタノール下地処理は効果が大きい。

4 エタノール前処理による O_3-TEOS シリコン膜の平坦化向上の機構

4.1 高感度反射 FTIR（RAS）によるエタノール