#### Amorphous Fluoropolymer CYTOP **Technical Documents**

# Dry etching characteristics of the CYTOP

Precautions for handling

Please be sure to read MSDS before using this product to ensure safe handling.

## 1 Cytop patterning examples processed in dry etching

The Cytop film can be etched with O2 gas. When the Cytop film has thickness of 2 µm and 4µm, the SEM photos showing the pattern process with a line width of 2  $\mu$ m are shown below.

# • Cytop SEM photo with patterning





Film thickness of 4 µm \* Line width of 2 µm





	Process flow	Conditions
↓ Silane coupling Substrate	Silane coupling coat	Silane coupling fluid (Shin-Etsu Chemical Co., Ltd.) KBE903 is diluted to 0.05% with ethanol/water in the ratio of 95/5. Coating condition: Spin coating 1500 rpm, baking at 80°C for 1 minute (electric griddle)
	•	
Cytop Substrate	Cytop coat	Cytop fluid: CTX-809A Coating condition: Spin coating 1500 rpm, baking at 50°C for 1 hour + baking at 180°C for 1 hour (oven)
↓↓ Surface treatment ↓↓	<b>↓</b>	
Cytop Substrate	Cytop surface treatment (For improvement of resist coating)	Etching system (Samco Inc.) RIE-10NR Treatment condition: Gas CF4/O2=15 sccm/5 sccm, 2.7 Pa, 200 W, 30 seconds
↓ ↓ Exposure ↓ ↓	↓	
Resist Cytop	Resist coat	Resist fluid (Tokyo Ohka Kogyo Co., Ltd.) OFPR-800 Coating condition: Spin coating 2000 rpm, at 90°C for 20 minutes
Substrate	Ļ	
Resist Cytop Substrate	Exposure	Exposure machine (Suss MicroTec KK) MA8 Radiating condition: g ray (432 nm), Light intensity: 152 mJ/cm2
Substrate	Ļ	
Cytop Substrate	Development	Developing fluid (Tokyo Ohka Kogyo Co., Ltd.) NMD-W Developing condition: Puddle development (40-second puddle 2 times + 10-second puddle 2 times), baking at 90°C for 20 minutes
	↓ I	
Substrate	Dry etching	Etching system (Samco Inc.) RIE-10NR Treatment condition: O2 50 sccm 10Pa, 200W
	<b>↓</b>	
		Peel fluid (Tokyo Ohka Kogyo Co., Ltd.): Peel fluid 106
Substrate		Peel condition: Immersion in peel fluid 106 <b>*</b> 3 minutes + Immersion in IPA <b>*</b> 3 minutes + Rinsing with ultrapure water

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# 2 Introduction of etching characteristics

When the power, pressure and flow rate are changed using the RIE system, the Cytop etching characteristics (etch rate and selectivity) are introduced below:



### (Wafer configuration)



- Ro: Resist film thickness Ro: Resist film thickness before etching
  Rt: Resist film thickness after etching
  Co: Cytop film thickness before etching
  Ct: Cytop film thickness after etching
  t: Etching time



### • Etching characteristics for each condition

(1) When the flow rate and pressure are constant and power is changed • The etch rate is increased along with increase of power.

· 200 W and 300 W have higher selectivity than 100 W.





#### (2) When the flow rate and power are constant and pressure is changed · The resist etch rate is increased along with increase of pressure, but the Cytop remains constant.

· The selectivity tends to be lowered along with the increase of pressure.





# (3) When the power and pressure are constant and flow rate is changed · When the flow rate is changed, the each rate and selectivity are almost constant



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