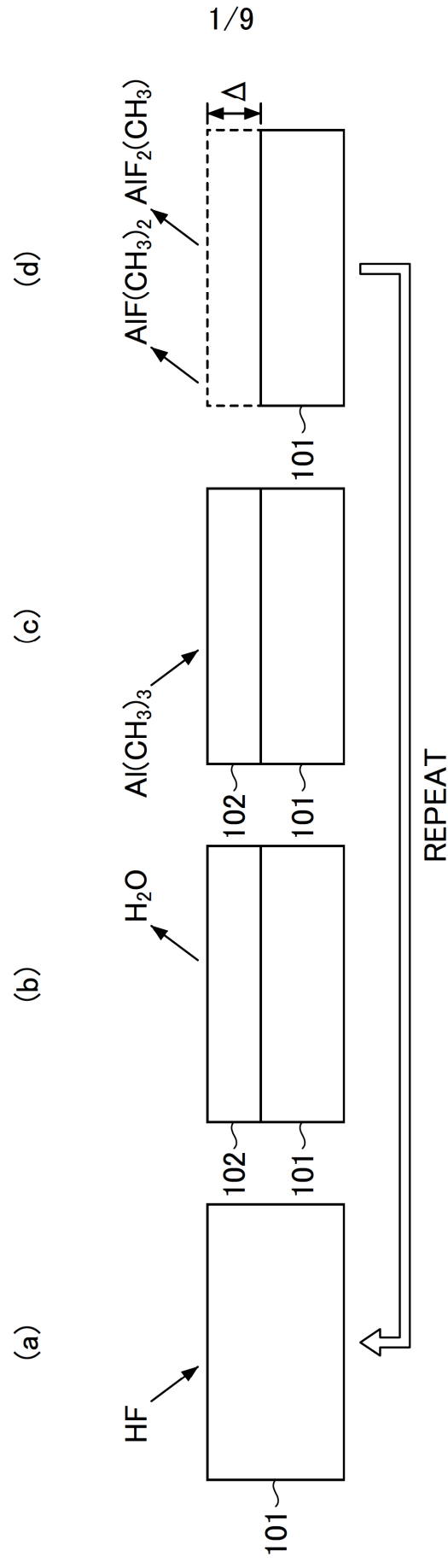
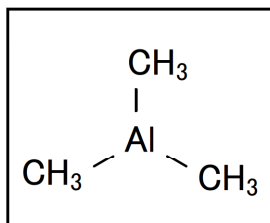


FIG.1

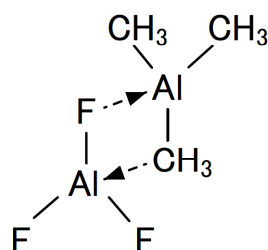


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FIG.2

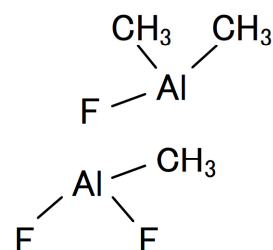
(a) TMA



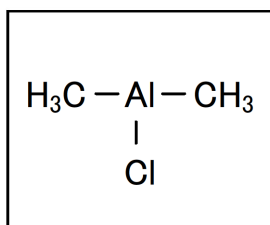
(b)



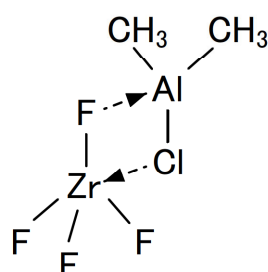
(c)



(d) DMAC



(e)



(f)

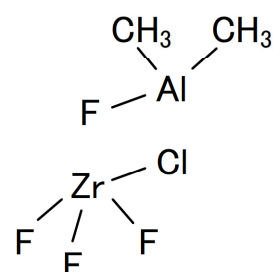


FIG.3

TARGET FILM	FIRST CLEANING GAS	SECOND CLEANING GAS
Al_2O_3	HF	TMA
	HF	TMA,DMAC
	HF	DMAC
	HF,SF ₄	Sn(acac) ₂
	HF	Sn(acac) ₂
	HF	Sn(acac) ₂ ,TMA, DMAC,SiCl ₄
	CHF ₃	TMA

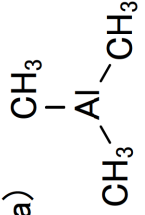
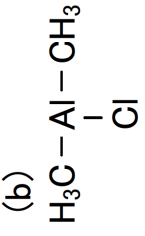
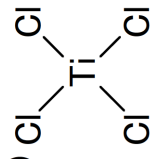
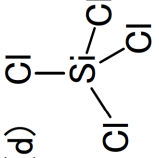
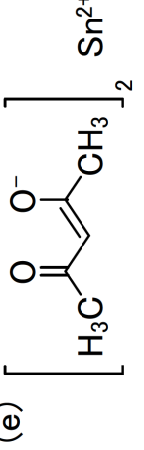
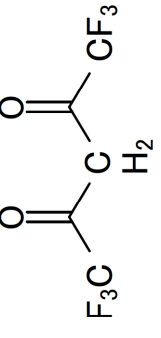
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FIG.4

TARGET FILM	FIRST CLEANING GAS	SECOND CLEANING GAS
HfO ₂	HF	DMAC
	HF	DMAC, TiCl ₄
	HF, XeF ₂ , SF ₄	DMAC, TiCl ₄
ZrO ₂	HF	Sn(acac) ₂ , TMA, DMAC, SiCl ₄
	HF	DMAC
	HF	DMAC, TiCl ₄
	WF ₆	DMAC
IGZO	HF	DMAC

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FIG.5

TARGET FILM	FIRST CLEANING GAS	SECOND CLEANING GAS
Co	Cl ₂	Hhfac,Hacac
	O ₂	Hfac
Cu	O ₃	Hfac
Fe	Cl ₂	Hacac
Mo	O ₃	BCl ₃
Ni	O ₂	Hhfac

FIG.6

FIRST CLEANING GAS	SECOND CLEANING GAS		
HF (HYDROGEN FLUORIDE)	TMA (TRIMETHYLALUMINUM)	(a)  (b) 	BOILING POINT: 127°C(TMA) BOILING POINT: 183°C(DMAC) VAPOR PRESSURE: 9torr(20°C) VAPOR PRESSURE: 79torr(60°C)
	DMAC (DIMETHYLALUMINUM CHLORIDE)		
	TiCl ₄ (TITANIUM TETRACHLORIDE)	(c)  (d) 	VAPOR PRESSURE: 262torr(100°C) VAPOR PRESSURE: 207torr(21°C)
	SiCl ₄ (TETRACHLOROSILANE)		
	Sn(acac) ₂ (TIN(II) ACETYLACETONATE)	(e) 	BOILING POINT: 110°C VAPOR PRESSURE: ~3torr(150°C)
	Hf ₆ ac (HEXAFLUOROACETYLACETONE)	(f) 	BOILING POINT: 70°C VAPOR PRESSURE: 104torr(25°C)
O ₂ , O ₃ , NO ₂			

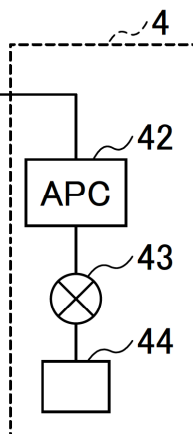


FIG.8

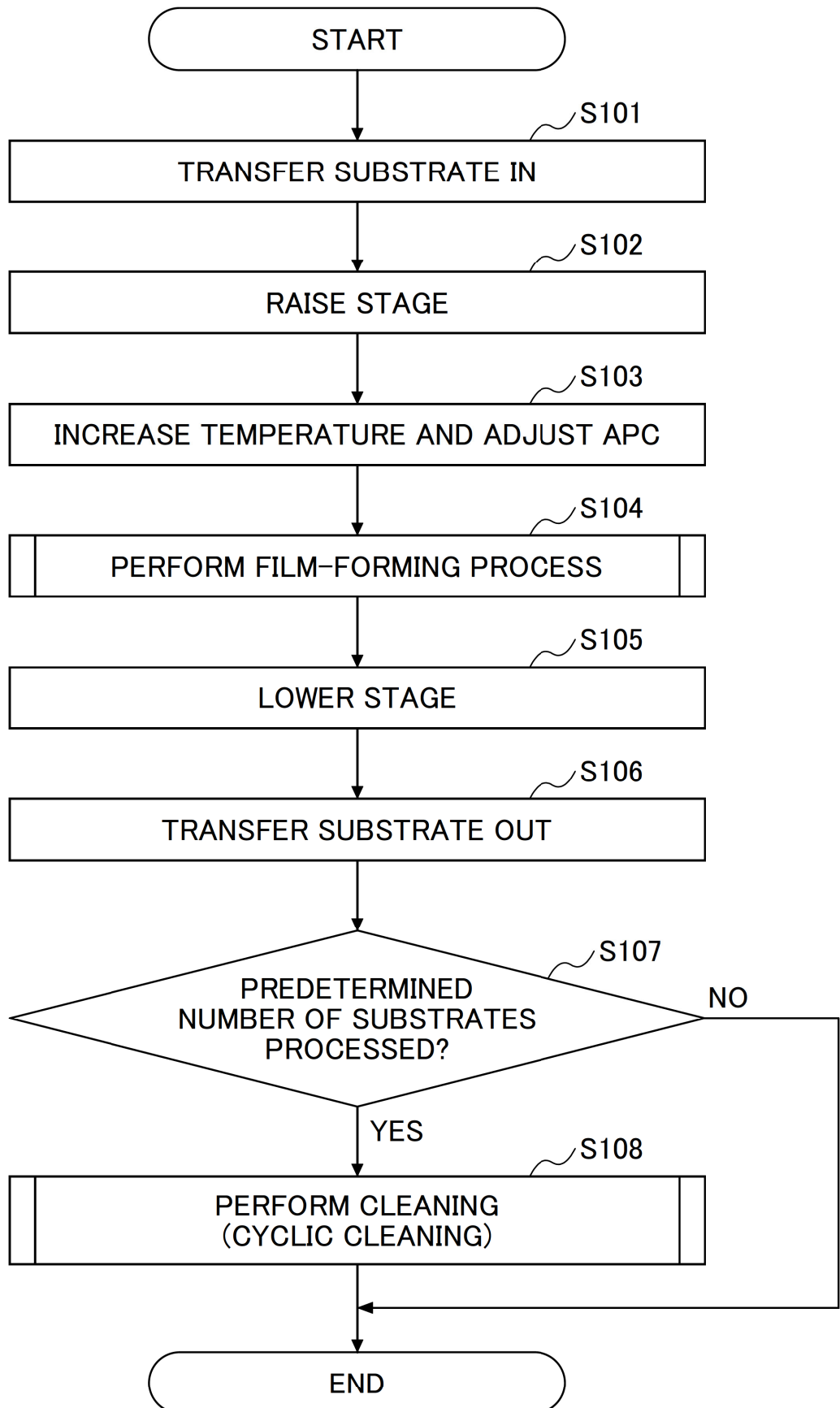


FIG.9

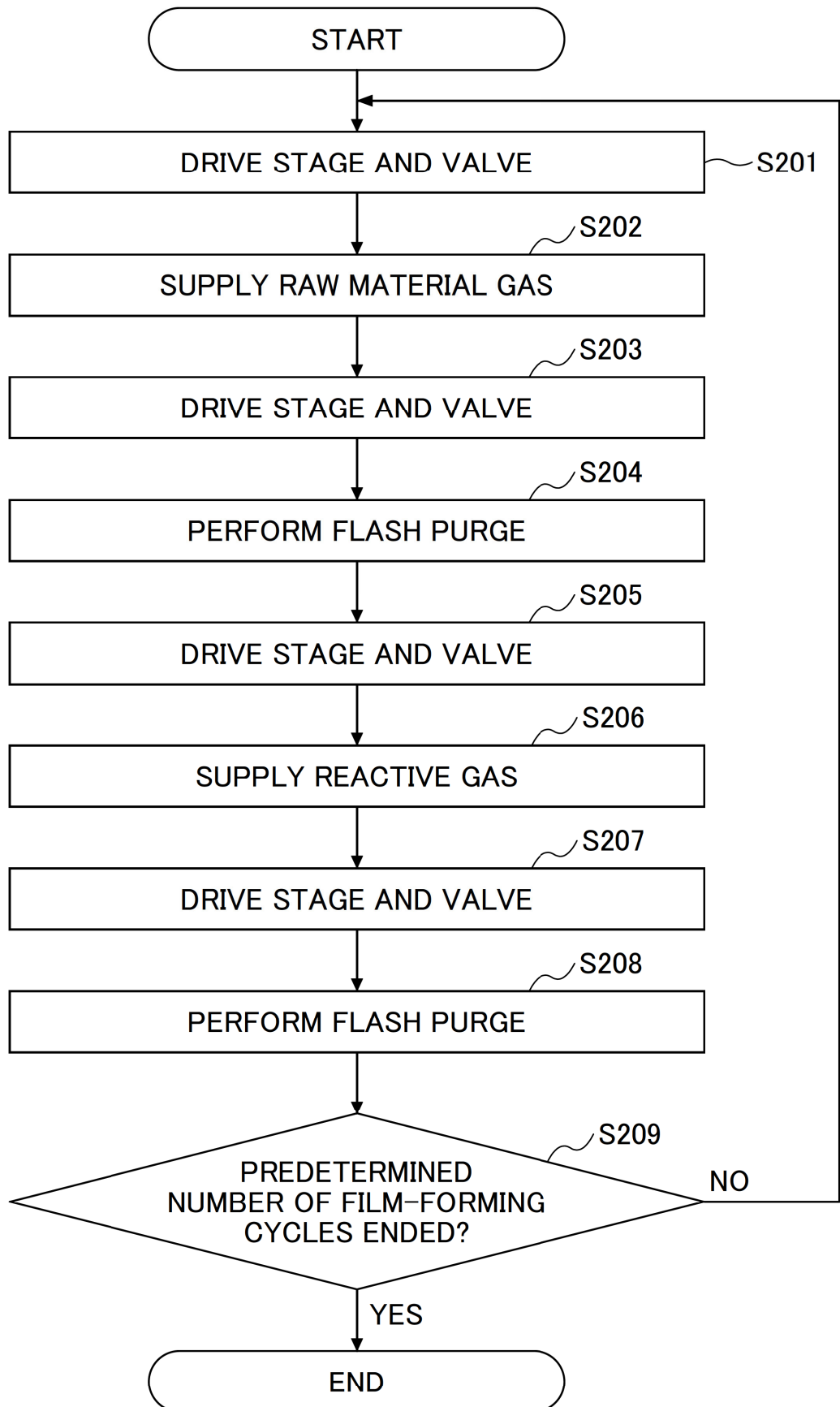


FIG.10

