



Journal Name

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Supplemently data

1.Table

S-1. Process data of Fig. 4

1 st Anodization	Material	High purity Aluminum(99.999%)
	Electrolyte	0.3M oxalic acid
	Temperature	-3°C
	Time	20hr
	Electrical condition	CC mode of 1mA/cm2
Etching process	Electrolyte	1.8wt% chromic acid + 6wt% phosphoric acid
	Temperature	65°C
	Time	2hr
2 nd Anodization	Material	High purity Aluminum(99.999%)
	Electrolyte	0.3M oxalic acid
	Temperature	-3°C
	Time	1hr, 4hr, 40hr
	Electrical condition	CC mode of 1mA/cm2

S-2 Process data of Fig. 5

1 st Anodization	Material	High purity Aluminum(99.999%)		
	Electrolyte	0.3M oxalic acid		
	Temperature	-3°C		
	Time	20min		
	Electrical condition	CC mode of 1mA/cm2		
Etching process	Electrolyte	1.8wt% chromic acid + 6wt% phosphoric acid		
	Temperature	65°C		
	Time	2hr		
2 nd Anodization	Material	High purity Aluminum(99.999%)		
	Electrolyte	0.3M oxalic acid		
	Temperature	-3°C		
	Time	90min		
	Electrical condition	CC mode of 1mA/cm2		
Widening	Electrolyte	0.1M phosphoric acid		
	Temperature	35c		
	Time	30min		
Lithography	Material	AZ4620(AZ electronic materials)		
	Pattern size	Pitch 30um, Diameter 15um		
	spin coating speed	1 st	500rpm - 5s	
		2 nd	1300rpm - 60s	
	Thickness	13um		
thermal carbonization	Hard bake	Temperature	95°C	
		Time	30min	
	Carbonization	Temperature rise to 200°C		
3 rd Anodization	Material	High purity Aluminum(99.999%)		
	Electrolyte	0.3M oxalic acid		
	Temperature	-3°C		
	Time	17hr		
	Electrical condition	CC mode of 5mA/cm2		
4 th Anodization	Material	High purity Aluminum(99.999%)		
	Electrolyte	0.3M oxalic acid		
	Temperature	-3°C		
	Time	5hr, 10hr, 15hr		
	Electrical condition	CV mode		

S-3 Process data of Fig. 6

1 st Anodization	Material	High purity Aluminum(99.999%)
	Electrolyte	0.3M oxalic acid
	Temperature	-3°C
	Time	10min
	Electrical condition	CC mode of 1mA/cm ²
Etching process	Electrolyte	1.8wt% chromic acid + 6wt% phosphoric acid
	Temperature	65°C
	Time	2hr
2 nd Anodization	Material	High purity Aluminum(99.999%)
	Electrolyte	0.3M oxalic acid
	Temperature	-3°C
	Time	20hr
	Electrical condition	CC mode of 1mA/cm ²

2.Figure

S-4. N-MLA surface contact angle

