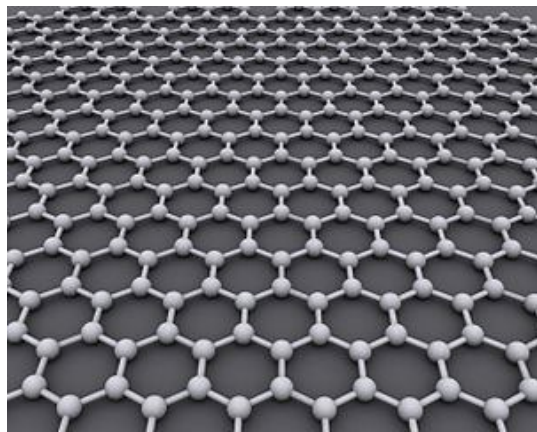




ESD Management by Graphene-Polymer Composite

石墨烯

- 1.需依附其它材料
- 2.導熱/散熱
- 3.吸波&ESD
- 4.高度抗腐蝕/阻氣



	石墨烯	碳管	碳管/石墨烯複材	銅	鋼
導熱係數 (W/m.k)	5,300	3,000	會提高, 但提高程度不一, 如摻入封裝膠中可提高k值 3 ~ 5 倍以上	401	60
熱輻射係數	0.96	0.98	0.5 ~ 0.8	0.03	
電阻	10^{-8}	10^{-4}	高分子複材: 10^2 絕緣 銀漿參雜: $1 \cdot 10^{-4}$	10^{-8}	10^{-6}

石墨烯應用實蹟-客戶

ADVANTECH

A4EON[®]
an ASUS assoc. co.



工業電腦

FOXCONN[®]
鴻海科技集團



光模塊

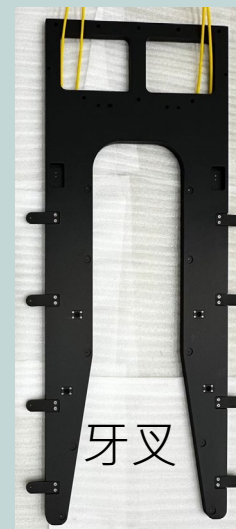
ASUS



電競筆電

熱管理

半導體封測大廠*^註



牙叉

註:保密協議

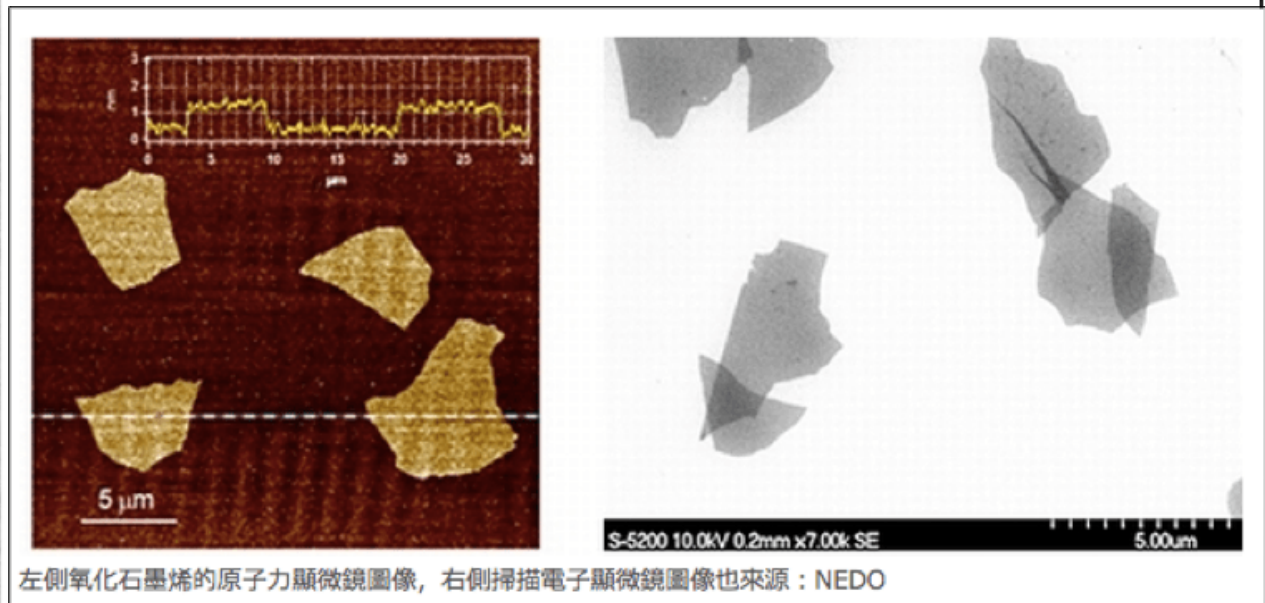
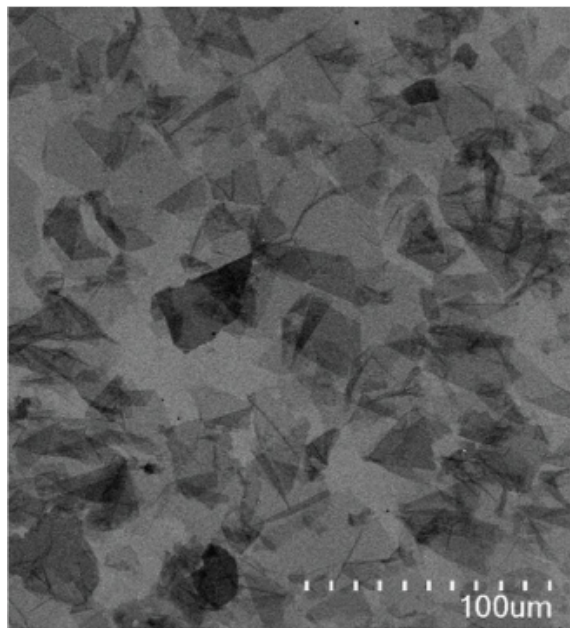
ESD電管理

石墨烯商用兩大關鍵

原材料

異材結合

Benchmark 日、德石墨烯原材料技術



左側氧化石墨烯的原子力顯微鏡圖像，右側掃描電子顯微鏡圖像也來源：NEDO

傳峰-臺瑞2016

日本石墨烯量產現況
2018年日本奈米展發表

Subject: AW: AW: Graphen samples

Dear Zack,

Thank you very much for this additional information.

However, unfortunately the photo is missing.

There is one important question from our side.

Your GO flakes seem to be quite large. What happens during reduction?

According to our knowledge, such treatment will reduce the flake size significantly.

Did you solve this problem?

For electrical applications we would see flakes as large as possible, thinner than 10 monolayers, and almost no residual Oxygen. And, of course a “perfect” lattice structure without dangling bonds.

Can you comment on this without disclosing any trade secrets?

Best Regards

Harald

Von: Lin [mailto:Lin@t-biz.com.tw]

Gesendet: Mittwoch, 29. November 2017 05:59

An: Müller, Harald

Cc: blumchen@hertillanng.com; christian.schamper@z.fraunhofer.de; Dicky Yeh

The screenshot shows the website of Fraunhofer IAF. The header includes the Fraunhofer IAF logo and navigation links for '事業', '媒體', '活動', '聯繫', and '德語'. Below the header, there is a green bar with '商情', '研究', '應用', and '該研究所'. The main content area features a title '用於超級電容器的多孔石墨烯有機網絡' and a photo of a porous graphene structure. To the right of the photo, there is a description of the G-ONET project. Below the photo, there is a caption '©Fraunhofer IAF' and a note '天然石墨 (Hoffmann & Co Elektrokohle AG) 是生產石墨烯薄片的豐富資源。'. At the bottom, there is a table with '項目名稱' and 'G-ONET'. On the right side, there is a '聯繫' section with a photo of Sarah Roscher and her name 'Sarah Roscher' and title '項目經理'.

我們看到傳峰的石墨烯片非常大、而且少於10層，幾乎沒有殘留的氧，呈現完美的晶格結構。

在不牽涉到商業機密的情況下，你能跟我說明一下嗎？

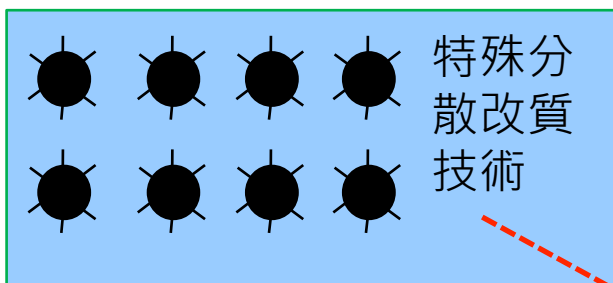
石墨烯兩大商用關鍵

原材料

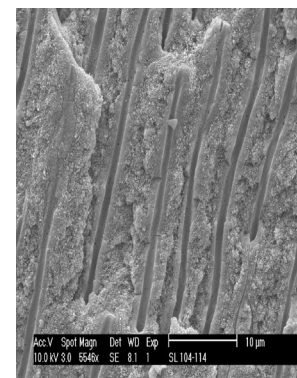
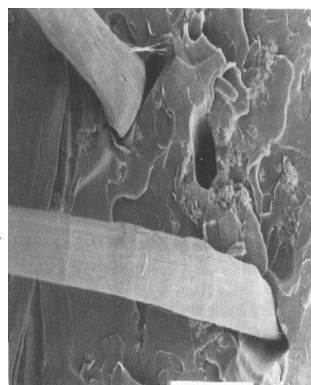
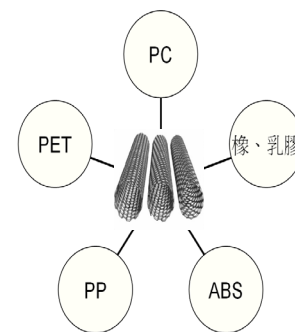
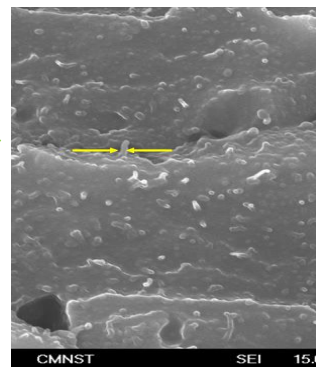
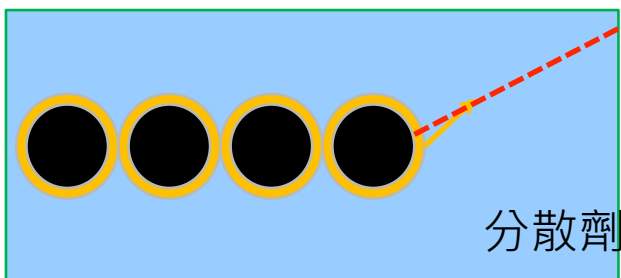
異材結合

KeyNote—分散&改質

臺瑞-改質系統

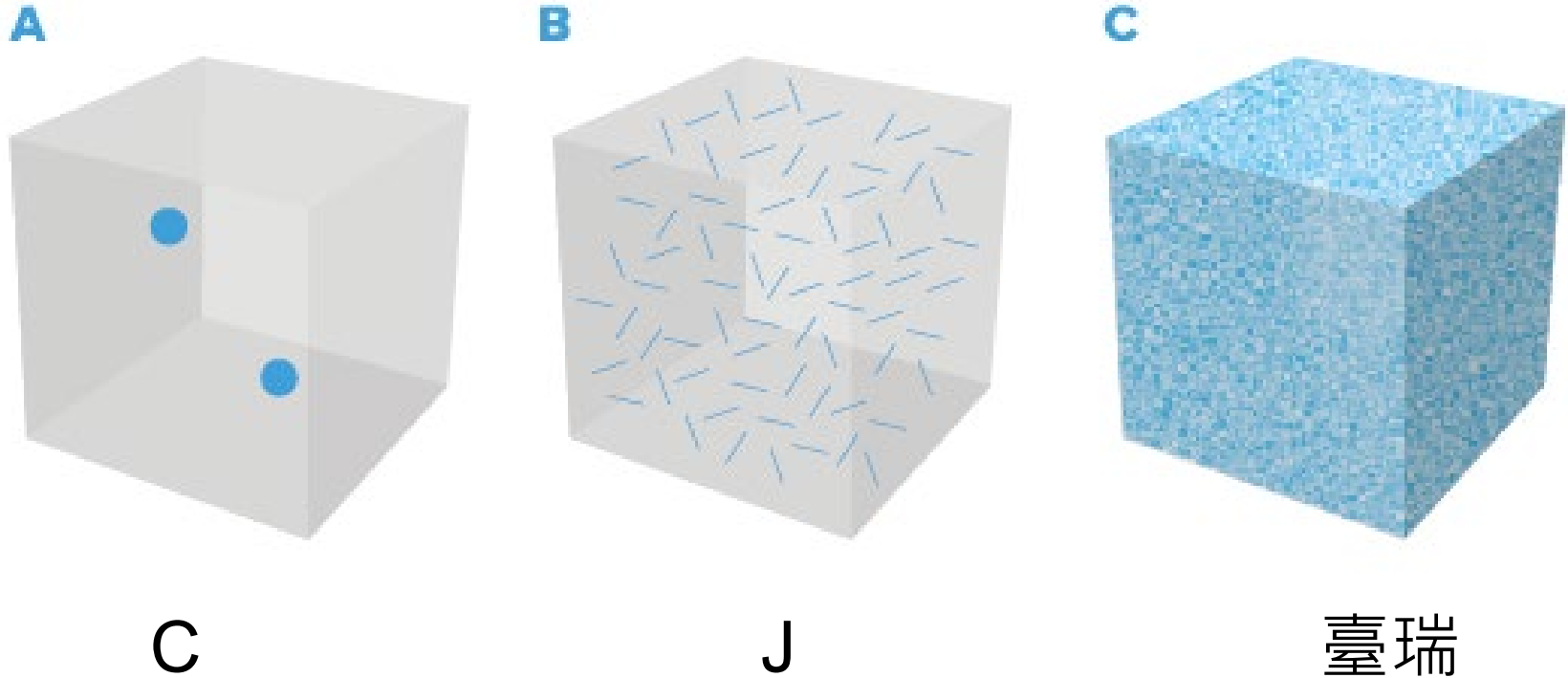


高分子
市面上-分散劑系統



高分子

優異的分散技術



Benchmark:異材結合塗層



臺瑞



它家

臺瑞抗靜電塗層技術更新

水性(第二代)

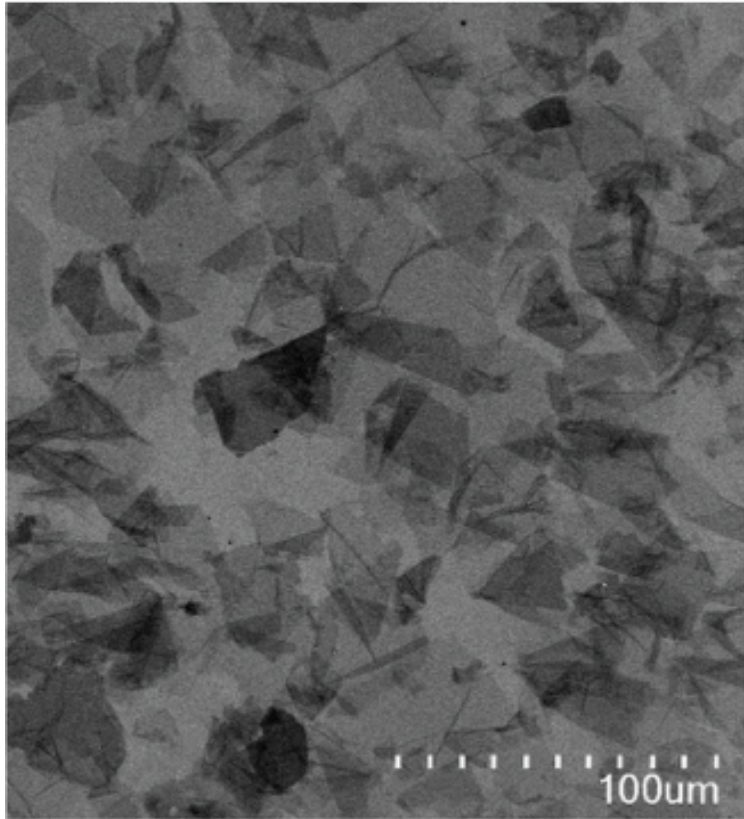
- ESG
- 6個月
- 抗刮/百格5B
- 抗UV
- 耐濕
- 不掉粉
- 表面細緻

溶劑型(第一代)

- 疏水 (接觸角 >90)
- 6個月以上
- 抗刮/百格5B/5H
- 耐酒精/擦拭
- 耐溫200度以上
- 耐蝕刻液腐蝕
- 不掉粉

臺瑞水性石墨烯抗靜電塗層

以水性塗層為例



- 各種材質皆可塗裝
- 電阻可精準調控
- 消光黑&半透明
- 抗刮/耐候/耐擦拭/200度
- 環保

水性塗層適用於各種材質



Carbon fiber part with a black coating, showing a rectangular shape with a central cutout and several mounting holes.

碳纖



A circular glass part with a black coating, showing a smooth surface and a few small holes.

玻璃



A circular stainless steel part with a black coating, showing a metallic surface and several mounting holes.

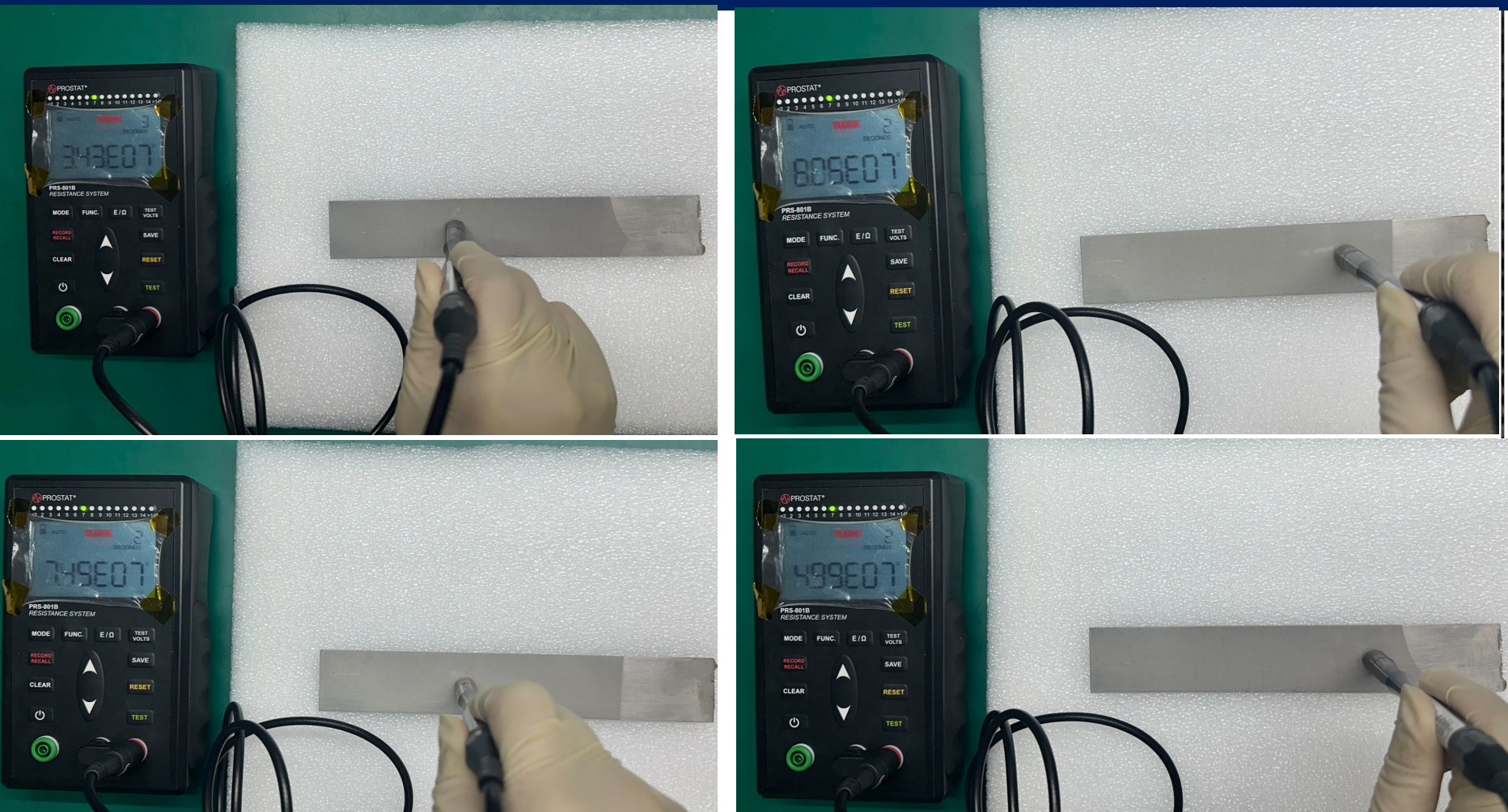
不鏽鋼



A rectangular plastic part with a black coating, showing a smooth surface.

塑膠

塗層表面電阻穩定、可調控



不同材質噴塗表面電阻測試

Coating	Carbon Fiber	Cermic	Al(硬陽)	Wood	Steel(S304)
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樣品		碳纖維				鋁陽極本色				陶瓷板1				S304				Wood			
測量電壓		10V		100V		10V		100V		10V		100V		10V		100V		100V		10V	
測量方式	點位	數值	10 ^e	數值	10 ^e	數值	10 ^e	數值	10 ^e	數值	10 ^e	數值	10 ^e	數值	10 ^e	數值	10 ^e	數值	10 ^e	數值	10 ^e
方法1	1	7.18	7	2.37	7	6.04	7	4.75	7	7.01	7	1.01	7	3.57	7	5.64	7	9.47	7	6.60	7
	2	7.33	7	2.43	7	8.48	7	3.28	7	7.23	7	3.11	7	6.16	7	4.16	7	1.24	8	6.12	7
	3	7.48	7	2.27	7	6.91	7	3.68	7	3.60	7	2.80	7	5.99	7	3.57	7	1.34	8	7.19	7
方法2	1	5.76	7	1.25	7	2.99	7	2.77	7	4.03	6	6.70	6	1.79	7	1.90	7	6.00	7	5.49	7
	2	1.22	7	1.21	7	2.54	7	2.60	7	3.21	6	7.21	6	1.87	7	2.78	7	6.12	7	5.62	7
	3	1.44	7	1.37	7	3.02	7	2.61	7	1.00	7	6.50	6	2.39	7	1.99	7	5.12	7	5.11	7

結語

- ◆ 臺瑞可依客戶需求提供抗靜電塗層
- ◆ 水性抗靜電塗層的電阻值穩定度及機械性質
應用 達標準以上
- ◆ 水性抗靜電塗層表面電阻值 5~9次方穩定,
6~8次方可調控制
- ◆ 水性抗靜電塗層是未來趨勢(ESG) , 環境
Friendly choice!