# Trace impurity analysis

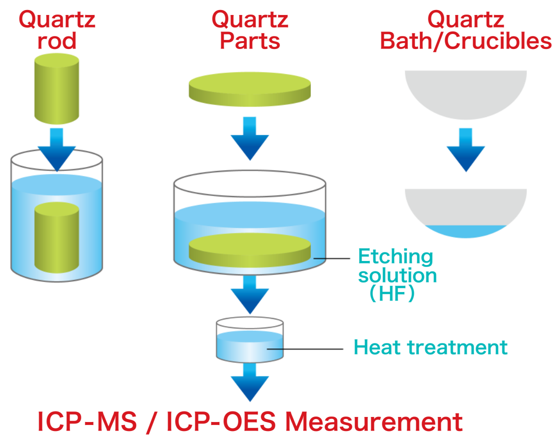
# 高純度石英玻璃之微量不純物分析

## 經由ICP-MS管理表面與表層金屬汙染

### 半導體製程裝置之治具、洗淨槽分析

半導體製程所指用石英玻璃治具，需為更高純度的石英製品。
ICP-MS 適用於分析高純度石英玻璃表面、表層與Bulk之金屬不純物分析。

#### < Flow of Quartz Analysis Method >




ICP-MS / ICP-OES Measurement

#### < Analytical Sample >

- 半導體製程裝置治具
  (舟、爐芯管、環、加熱器)
- 洗淨槽
- 光罩材、晶圓
- 單晶拉坩堝

**Quartz sample set up**

**Sample preparation**

a) Metallic contamination
on the outermost surface removal
or no removal (as it is)

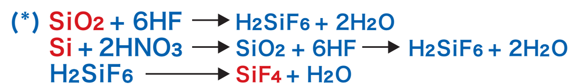
b) ① Dissolution of surface contamination
② Decomposition of surface layer
ex.) 0-1um/1-2um/2-3um/......
③ Total decomposition of sample

c) Heat treatment (Si removal(*))

**Measurement**

a) Determination of trace metal by ICP-MS
b) Determination of Si by ICP-OES
c) Calculation

**Report**




### 高純度石英玻璃治具之縱深分向金屬不純物分析

Unit : ppb (ng/g)

| Depth(μm) | Bulk | 0−1(μm) | 1−2(μm) | 2−3(μm) | 3−4(μm) |
|---|---|---|---|---|---|
| Li | 220 | 1500 | 1600 | 1300 | 1100 |
| Na | 130 | 6500 | 920 | 560 | 500 |
| Mg | 18 | 1100 | 300 | 130 | 60 |
| Al | 15000 | 34000 | 35000 | 26000 | 19000 |
| K | 240 | 5900 | 5200 | 4700 | 4200 |
| Ca | 380 | 4100 | 2700 | 2000 | 1300 |
| Fe | 56 | 710 | 260 | 180 | 140 |
| Cu | ＜20 | 40 | ＜20 | ＜20 | ＜20 |
| ICP-OES $SiO_2$ (g) | | 0.014 | 0.013 | 0.014 | 0.014 |
| Etching depth (μm) | | 1.00 | 0.94 | 0.99 | 1.03 |

石英玻璃治具表層多層段分析結果與石英玻璃Bulk分析結果相比較，可以確定縱深分向上的金屬不純物濃度。

*Your satellite laboratories.*

SCAS Sumika Chemical Analysis Service