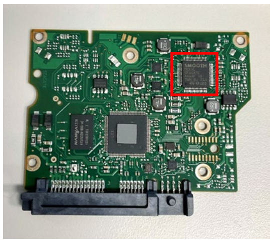
古いHDD基盤のICチップ断面　マッピング

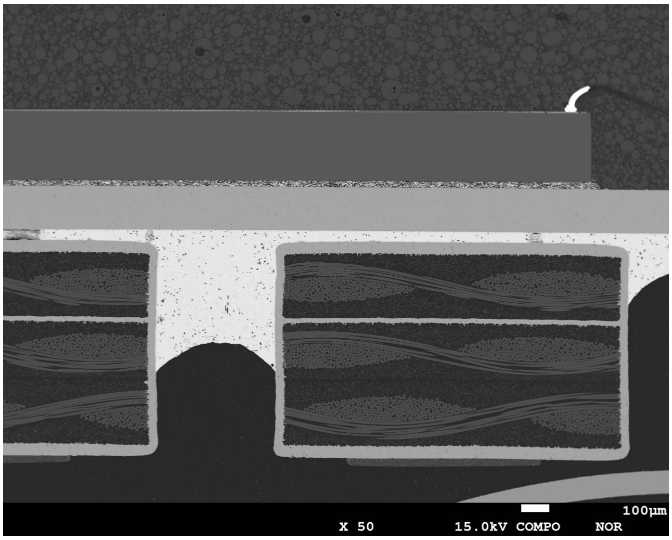


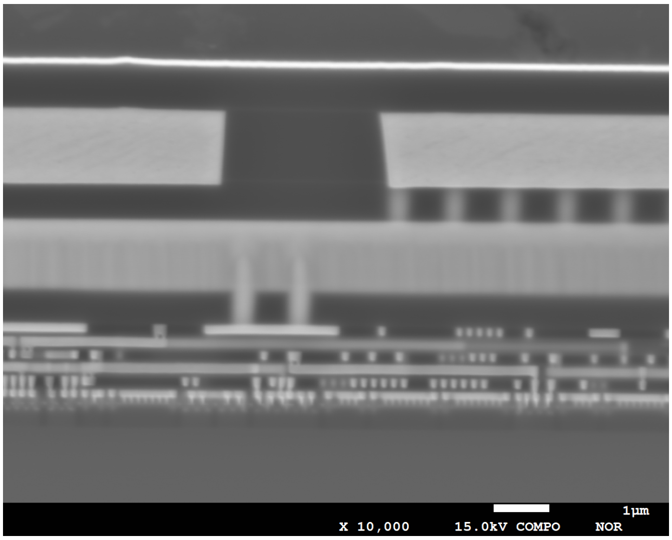
試料調製

① 切断
② 冷間樹脂埋め（エポフィックス）
③ 鏡面研磨（耐水研磨紙、アルミナ砥粒、
　コロイダルシリカ）
④ カーボン蒸着

SEM観察

＜観察条件＞　加速電圧：15 kV, 照射電流：30 nA



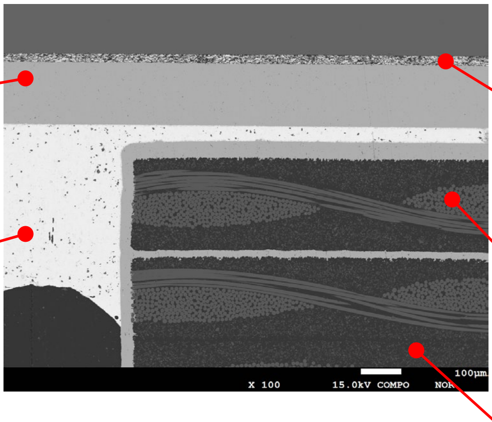


全元素定性分析（低倍）

＜分析条件＞　加速電圧：15 kV, 照射電流：30 nA, ビーム径：10 µm

```
ZAF Metal
Element     Mass(%)    Atom(%)      K(%)
 C           10.457    19.8640     0.877
 Si          98.667    80.1360    97.488
 -----------------------------------------
 Total      109.124   100.0000    98.365
```

```
ZAF Metal
Element     Mass(%)    Atom(%)      K(%)
 C            1.569    11.8948     1.520
 O            1.117     6.3571     0.193
 Ag           2.799     2.3620     2.893
 Sn         103.505    79.3861   101.773
 -----------------------------------------
 Total      108.990   100.0000   106.378
```



```
ZAF Metal
Element     Mass(%)    Atom(%)      K(%)
 C           12.338    46.7335     8.046
 O            2.795     7.9475     0.702
 Si           0.357     0.5779     0.278
 Ni           0.714     0.5531     0.734
 Cu          23.718    16.9782    23.448
 Ag          64.521    27.2099    59.477
 -----------------------------------------
 Total      104.443   100.0000    92.686
```

```
ZAF Metal
Element     Mass(%)    Atom(%)      K(%)
 C            4.120    18.8004     1.468
 Si           1.392     2.7155     0.894
 Cu          91.015    78.4842    89.487
 -----------------------------------------
 Total       96.527   100.0000    91.850
```

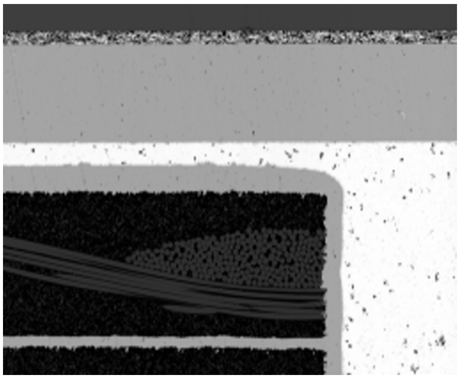
```
ZAF Metal
Element     Mass(%)    Atom(%)      K(%)
 C           56.082    57.7696    22.000
 O           39.966    30.9020    10.055
 Al           3.949     1.8106     3.017
 Si          13.609     5.9938    11.283
 P            0.357     0.1424     0.278
 Ca          10.955     3.3816    10.028
 -----------------------------------------
 Total      124.918   100.0000    56.662
```

マッピング

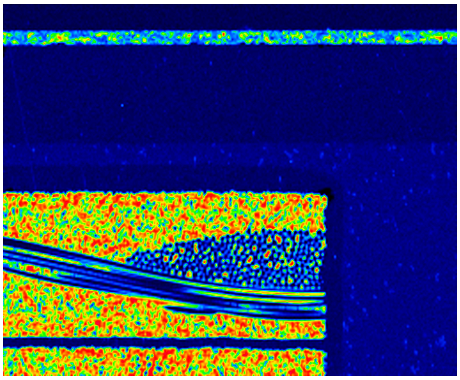
＜分析条件＞　加速電圧：15 kV, 照射電流：30 nA, ビーム径：3 µm, 測定時間：40 ms

＜分光器条件＞

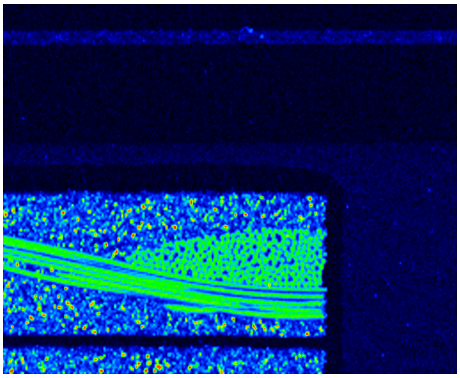
Sn：PETH(1ch) Lα1
Ag：PETH(1ch) Lα1
Al：TAP(2ch) Kα1
Si：TAP(2ch) Kα1
O：LDE1H(3ch) Kα1
C：LDE2H(3ch) Kα1
Cu：LiFH(4ch) Kα1
Ca：PETH(4ch) Kα1



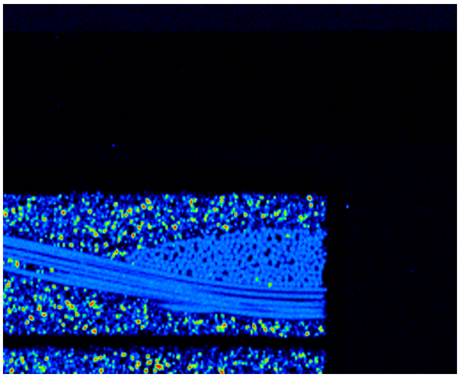
COMPO 100 um



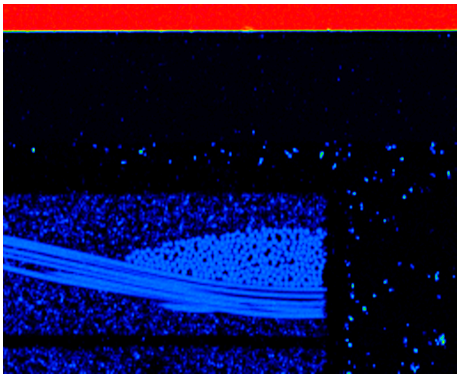
C 100 um



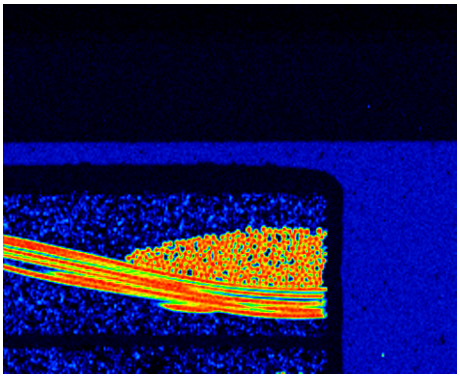
O 100 um



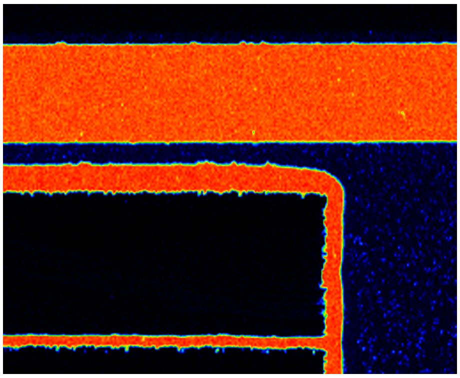
Al 100 um



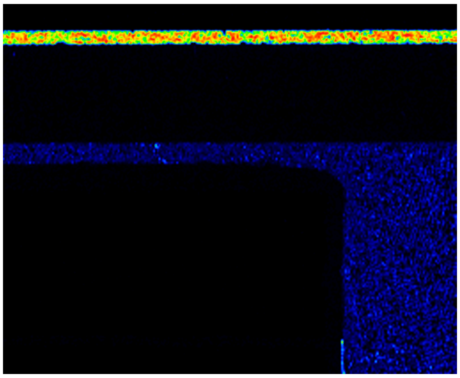
Si 100 um



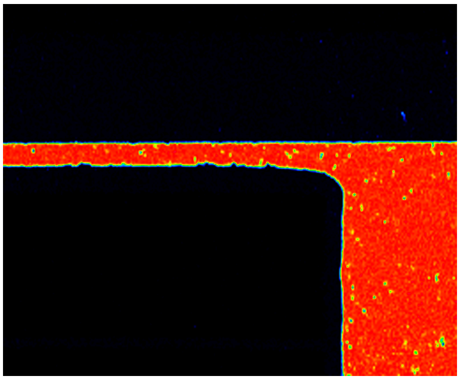
Ca 100 um



Cu 100 um



Ag 100 um



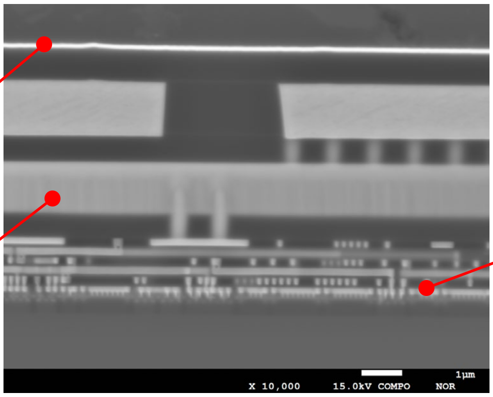
Sn 100 um

全元素定性分析（高倍）

＜分析条件＞　加速電圧：15 kV, 照射電流：30 nA, ビーム径：10 µm

```
ZAF Metal
Element    Mass(%)    Atom(%)       K(%)
 C           5.040    10.4784      0.939
 N           1.482     2.6406      0.440
 O          21.576    33.6712      9.094
 Al         25.856    23.9285     22.063
 Si         24.490    21.7688     16.338
 Cu          5.421     2.1299      5.024
 Ta         39.008     5.3827     28.173
 ------------------------------------
 Total     122.873   100.0000     82.071
```

```
ZAF Metal
Element    Mass(%)    Atom(%)       K(%)
 C           3.871    17.0905      1.056
 O           6.189    20.5107      3.125
 Si         11.237    21.2114      7.604
 Cu         45.571    38.0237     43.668
 Ta         10.796     3.1637      8.162
 ------------------------------------
 Total      77.664   100.0000     63.615
```



```
ZAF Metal
Element    Mass(%)    Atom(%)       K(%)
 C          11.002    29.8125      1.715
 O          16.036    32.6191      6.088
 Si         29.012    33.6138     24.501
 Cu          7.722     3.9546      6.370
 ------------------------------------
 Total      63.772   100.0000     38.674
```

マッピング

＜分析条件＞　加速電圧：15 kV, 照射電流：30 nA, 測定時間：1 ms, 積算回数：20

＜分光器条件＞

Ta：LiFH(1ch) Lα1　　Si：TAP(2ch) Kα1
Al：TAP(2ch) Kα1　　Cu：LiFH(4ch) Kα1