C2020W - (1) General Information

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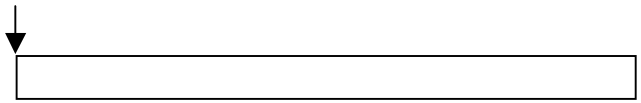
mapping and chemical analysis performed in April and May 2006
report sent 19 June 2006

- Dimensions of the foil: 13.1*1.4 mm^2.
-SEM-FEG Hitachi S4700, equipped with EDS system
- The sample was held with 2 strips of carbon double tape and analyzed according to the following scheme:

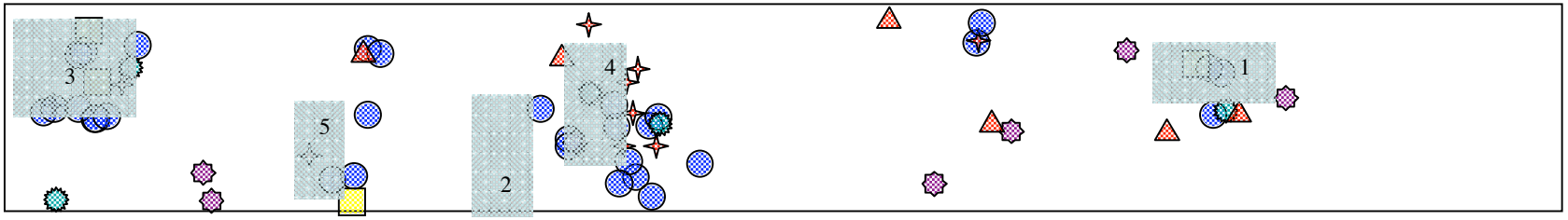
(part A : start of scan)

PartA (black dot on rear of foil)



-<u>First search for craters in whole sample</u> (20 kV;I = 10 μA) at G x 250.
-5 zones selected at random for 2nd search at Gx1000
-- 66 craters identified, roughly 3 clusters and many double or « twin » craters

(2) Craters localization, 1



zone 1 :Δx = 1 mm ,Δy = 0.5 mm,from (9,37;-0,31)
zone 2 :Δx = 0.5 mm,Δy = 1 mm,from (3,81;-0,74)
zone 3 :Δx = 1mm,Δy = 0.8 mm,from (0,07;-0,12)
zone 4 :Δx = 0.5mm,Δy = 1 mm,from (4,57;-0:32))
zone 5 :Δx = 0.4 mm,Δy = 0.8 mm,from (2,37;-0,62)
zones shown by grey rectangles, chosen at random

exact positions of zones, given page 5

(3) Craters localization,2

- scanning at Gx250

Crater #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
x (mm)	0,32	0,61	0,93	1,52	1,59	2,83	2,46	2,86	4,56	4,45	4,27	idem# 10	idem# 9	4,56	4,50
y (mm)	1,5	0,02	0,42	1,28	1,51	0,30	0,3	0,26	1,03	0,33	0,75			1,0	1,06

Crater #	16	17	18	19	20	21	22	23	24	25	26	27	35
x (mm)	5,18	5,25	5,57	7,12	7,49	7,96	7,83	7,85	7,87	9,06	9,39	10,4	8,12
y (mm)	1,47	0,88	1,20	0,02	1,37	0,87	0,21	0,20	0,05	0,28	0,94	0,67	0,94

- zone1-Gx1000

Crater #	28	29	30	31	32	33	34
x (mm)	9,62	9,76	9,73	9,83	9,87	9,86	9,98
y (mm)	0,38	0,8	0,42	0,46	0,77	0,8	0,21

- zone5-Gx1000

Crater #	63	64	65	66
x (mm)	0,02	0,15	0,36	0,38
y (mm)	0,52	0,71	0,89	0,68

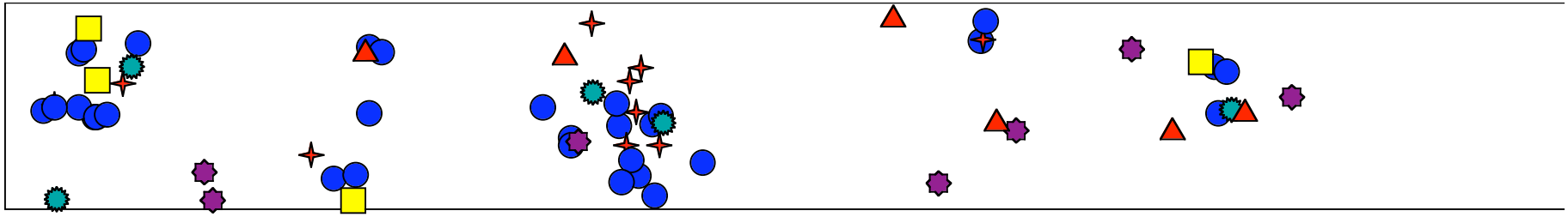
- zone3-Gx1000

Crater #	38	39	40	41	42	43	44	45	46	47
x (mm)	0,14	0,43	0,43	0,57	0,47	0,58	0,56	0,66	0,79	0,91
y (mm)	0,66	0,19	0,63	0,71	0,16	0,41	0,71	0,69	0,44	0,11

- zone4-Gx1000

Crater #	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
x (mm)	0,1	0,11	0,33	0,32	0,3	0,41	0,38	0,42	0,48	0,46	0,5	0,66	0,59	0,65	0,61
y (mm)	0,39	0,31	1,04	0,58	0,4	0,22	0 ,74	0,86	0,99	0,47	0,11	0,49	0,57	0,73	0,77

(4) Craters localization,3



cluster 2
(craters 2;3 ; 38 → 47)

cluster 1
(craters 9 → 17 ; 48 → 62)

cluster 3
(craters 25 → 27 ; 28 → 34)

crater with diameter ≤ 0,5 µm (11)

crater with 0,5 µm < diameter ≤ 1 µm (31)

crater with 1 µm < diameter ≤ 1,5 µm (4)

crater with 1.5 µm < diameter ≤ 2 µm (5)

crater with 2 µm < diameter ≤ 3 µm (7)

crater with diameter ≥ 3 µm (6)

all twins and doubles are in clusters 1, 2 or 3, except craters 49, 59, 65 and 66

(5) Size distribution,1

#crater	x	y	D (μm)
63	2,39	-1,1	0,13
37	0,30	-0,73	0,23
46*	0,86	-0,56	0,25
54	4,95	-1,06	0,34
53	4,98	-0,54	0,36
23	7,85	-0,20	0,38
58*	5,07	-0,43	0,42
62*	5,18	-1,09	0,44
48*	4,67	0,07	0,47
61	5,22	-1,06	0,48
57	5,03	-0,79	0,5
14	4,56	-1,00	0,55
29	9,76	-0,80	0,55
64	2,52	-1,3	0,55
40	0,50	-0,75	0,57
38	0,21	-0,78	0,59
39	0,50	-0,31	0,59
44*	0,63	-0,83	0,61
47*	0,98	-0,23	0,61
55	4,99	-1,18	0,63
60	5,16	-0,89	0,66
41	0,64	-0,83	0,67
15	4,50	-1,06	0,71
30	9,73	-0,42	0,71
59*	5,23	-0,82	0,75
66*	2,75	-1,3	0,75
56	5,05	-1,31	0,77
36	0,30	-0,75	0,78
45	0,73	-0,81	0,78
50	4,91	-1,36	0,8
18	5,57	-1,20	0,81
33	9,86	-0,80	0,81
42*	0,54	-0,28	0,82
11	4,27	-0,75	0,83
51	4,89	-0,90	0,84
22	7,83	-0,21	0,9
52	4,87	-0,72	0,9
8	2,86	-0,26	0,91
16	5,18	-1,47	0,91
31	9,83	-0,46	0,91
7	2,46	-0,30	0,98
24	7,87	-0,05	0,99
65*	2,73	-1,5	1,04
43	0,65	-0,53	1,15
2	0,58	-0,11	1,17
28	9,62	-0,38	1,23
1	0,32	-1,50	1,69
49*	4,68	-0,63	1,77
17	5,25	-0,88	1,82
32	9,87	-0,77	1,82
3*	0,93	-0,42	1,97
27	10,36	-0,67	2,01
5	1,59	-1,51	2,02
4	1,52	-1,28	2,09
9	4,56	-1,03	2,32
25	9,06	-0,28	2,34
20	7,49	-1,37	2,84
35	8,12	-0,94	2,84
10	4,45	-0,33	3,1
19	7,12	-0,02	3,23
34	9,98	-0,79	3,23
6	2,83	-0,30	3,29
21	7,96	-0,87	3,42
26	9,39	-0,94	3,73

*** = double or twin craters**

*Al foil (12.7*1.68 mm²)*

(0,0) top left, under black dot

zone 1 : Δx = 1 mm , Δy = 0.5 mm, from (9,37;-0,31)
zone 2 : Δx = 0.5 mm, Δy = 1 mm, from (3,81;-0,74)
zone 3 : Δx = 1mm, Δy = 0.8 mm, from (0,07;-0,12)
zone 4 : Δx = 0.5mm, Δy = 1 mm, from (4,57;-0:32)
zone 5 : Δx = 0.4 mm, Δy = 0.8 mm, from (2,37;-0,62)

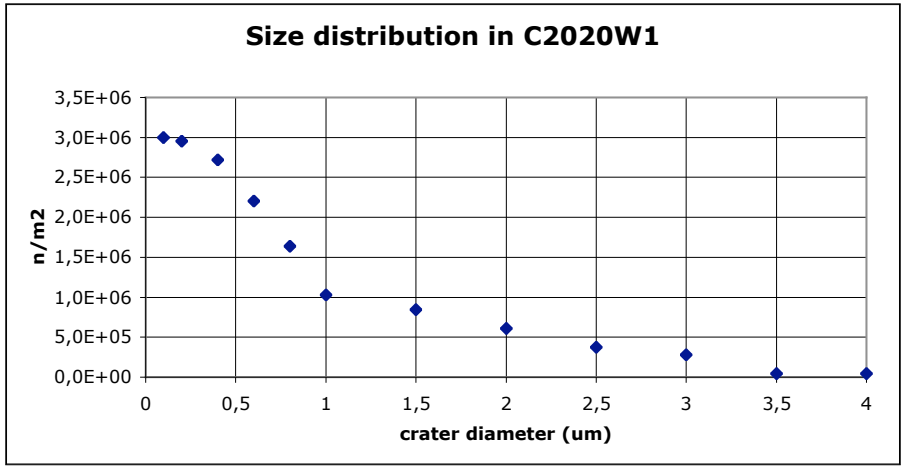
zones chosen at random

black : craters found at Gx250
purple, craters in zone 1, at G x1000
blue, craters in zone 3, at Gx1000
red, craters in zone 4, at Gx1000
green, craters in zone 5, at Gx1000
(no craters found in zone 2)

(6) Size distribution, 2

(without counting twins and doubles)

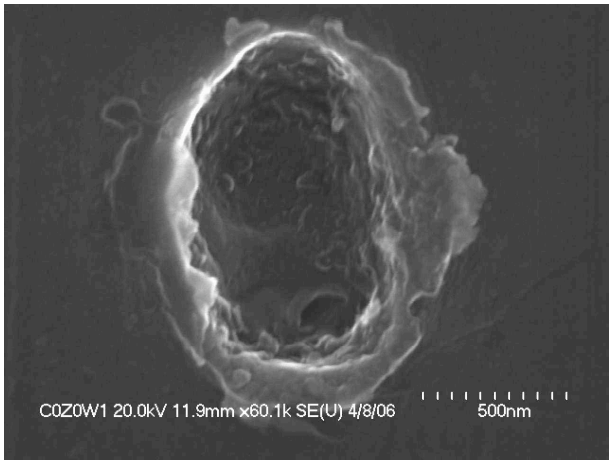
n(D>value)	D value(μm)	Φ (n/m2)
64	0,1	3,00E+06
63	0,2	2,95E+06
58	0,4	2,72E+06
47	0,6	2,20E+06
35	0,8	1,64E+06
22	1	1,03E+06
18	1,5	8,43E+05
13	2	6,09E+05
8	2,5	3,75E+05
6	3	2,81E+05
1	3,5	4,69E+04
1	4	4,69E+04



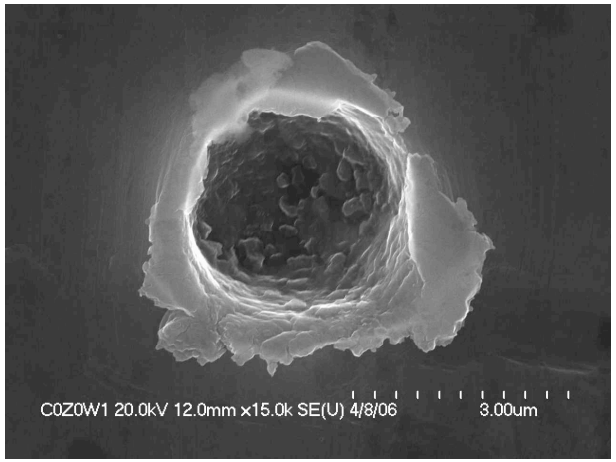
and counting doubles :

D_{max}μm	0,1	0,2	0,4	0,6	0,8	1	1,5	2	2,5	3	3,5	4
n	76	75	68	54	38	25	20	13	8	6	1	1

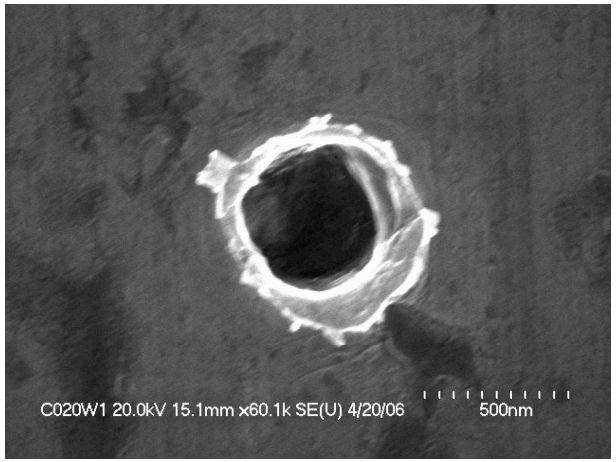
(7) A selection of images



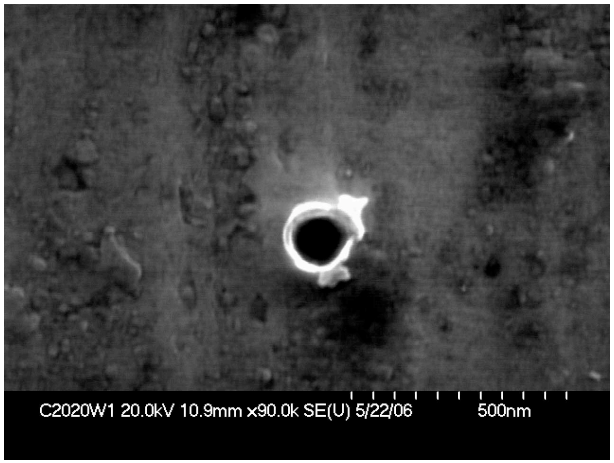
crater 3 (twin)



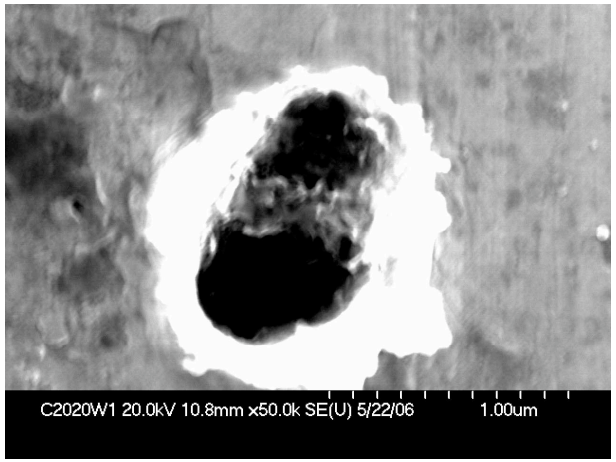
crater 6



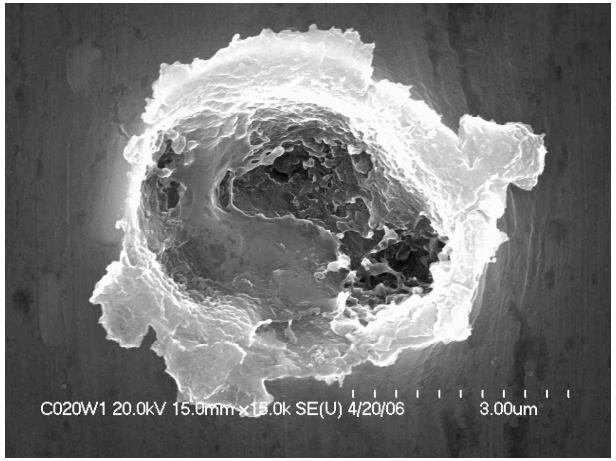
crater 14
deep and no visible structure



crater 63
(the smallest - 0.13μm)



crater 47 (double)



crater 26
(the largest - 3.72 μm)

(8) Analytical data (in atom%)

crater	O	Si	Mg	Fe-L	S
1	54,31	1,25	17,34	10,1	5,74
2	67,74	4,93	11,19	14,8	1,33
3	72,07		8,45	14,32	5,16
4	62,66	8,68	18,52	7,96	2,17
4	59,13	9,34	23,01	6,69	1,81
5	60,77	11,02	9,85	11,52	6,85
6	43,51	14,14	31,17	7,39	3,78
7	69,65	8,28	13,56	5,75	2,76
8	70,21	5,32	13,56	6,65	4,26
11	53,11	22,02	10,92	8,91	5,04
12	37,01	17,85	11,36	13,15	20,62
13	36,92	16,28	17,52	17,1	12,17
15	55,03	20,1	16,38	8,49	
16	76,16	13,37		6,21	4,26
17	39,75	15,95	11,39	14,43	18,48
18	62,9	14,37	2,49	14,96	5,28
19	58,88	16,37	7,36	9,77	7,61
20	60,35	17,93	7	12,1	2,62
21	36,13	14,36	39,97	5,11	4,44
22	87,14	7,93		3,97	0,96
23	82,8	6,19		2,75	8,27
24	64,92	19,78	7,09	3,55	4,66
25	43,46	17,01	16,85	6,3	16,38
26	53,11	17,28	11,06	11,98	6,57
27	31,29	13,79	7,33	31,9	15,69
28	48,91	11		16,64	23,44
29	62,66	7,4		19,41	10,53
30	54,78	7,76		24,03	13,43
31	60,33	19,73	12,37	5,93	1,64
32	58,1	14,15	4,49	18,09	5,17
33	66,61	12,07		17,24	4,08
33	70,48	16,55	5,57	5,57	1,83
34	63,79	11,8	2,29	13,22	8,9
36	75,41	5,17	8,26	4,55	6,62
37	77		3,99	15,96	3,05

only craters 1 to 37 were analysed (analytical conditions : 7 keV, 100 sec counting

craters 11 to 17 belong to cluster 1

craters 25 to 34 belong to cluster 3