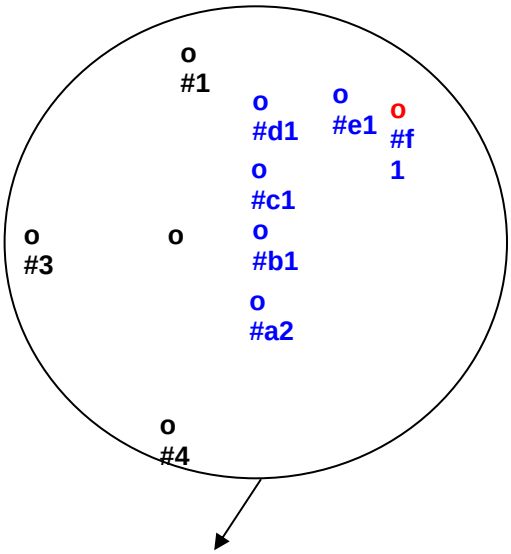
Absorption measurements on MMT4K04-1 before and after applying First Contact



Before

point #	Alpha [ppm]
1	1.05
2	0.983
3	0.9583
4	0.967

After

Point	Alpha
a2	1.00
b1	0.97
c1	0.97
d1	0.88
e1	0.84
f1	0.80

The **before** measurements were taken by Vlad, the **after** measurements were taken by Ashot.

9/20/06
Dear Helena,

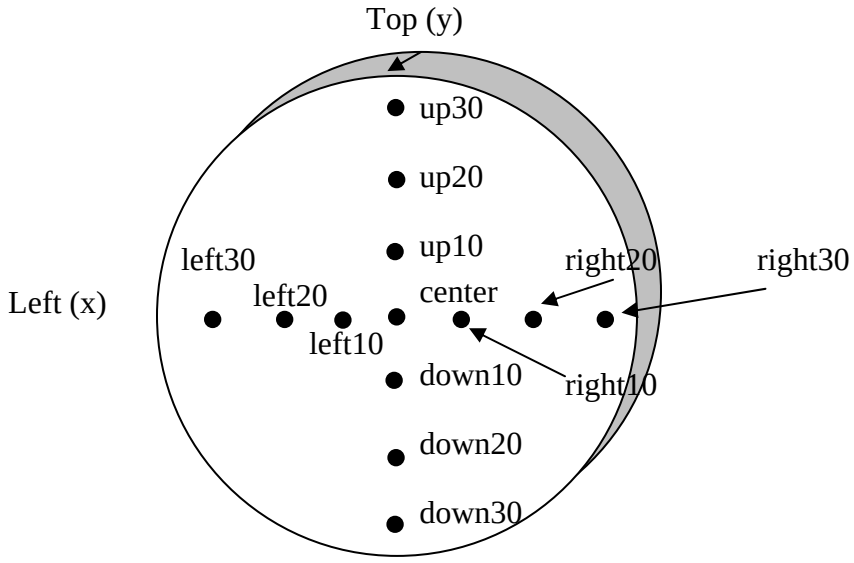
Please find attached the results on the MMT14K04-1 sample.
The average value, 1.15 ppm, turned out to be higher than the Vlad's one by about 15%. I guess this difference arises because of calibration.
I have some reasons to relay on my recent calibration rather than the Vlad's previous one. When you visit us, I will show you the reasons.
Tomorrow I am going to send back the sample.

Best,

Ashot.

MMT14K04-1

The "center" point is not a physical center. It is approximately coordinated in the (x,y)-plane with x and y = 35 mm both.
The "Top" has a an arrow mark. The arrow is directed to the coating.



Point #	(x,y) coordinates (mm) with respect to the center point	Point name	Alpha (ppm)
1	(0, 30)	Up 30	**1.19**
2	(0, 20)	Up 20	**1.18**
3	(0, 10)	Up 10	**1.24**
4	(0, 0)	Center (2 close points)	**1.22 (1.28)**
5	(0, -10)	Down 10	**1.23**
6	(0, -20)	Down 20	**1.26**
7	(0, -30)	Down 30	**1.22**
8	(-30, 0)	Right 30	**1.19**
9	(-20, 0)	Right 20	**1.13**
10	(-10, 0)	Right 10	**1.12**
11	(10, 0)	Left 10	**1.27**
12	(20, 0)	Left 20	**1.21**
13	(30, 0)	Left 30	**1.17**

The mirror was cover with First Contact for ~ 1 month and absorption was re-measured immediately after removing the film.

11/02/06
Hi, Helena.

The results of the measurements are attached.
After you left, the absorption started to increase rapidly and reached the previous value. Please look at the data. I am going to apply the "first contact" to the surface for a couple of weeks or 10 days and then record the time dependence.

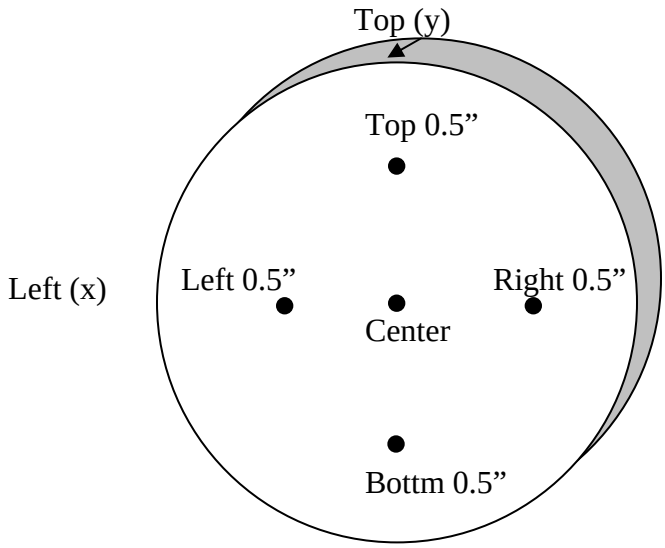
Ashot.

MMT14K04-1

The “center” point is not a physical center. It is coordinated approximately.
“Top” is marked by an arrow. The arrow is directed to the coating.

The absorption quickly increased after your departure, Helena, to the values I have measured a couple of months ago! Now, I am going, after your OK, to cover the optic by

a polymer film again, wait for a week or so, then record time-dependence of Alpha form one selected point immediately after opening.

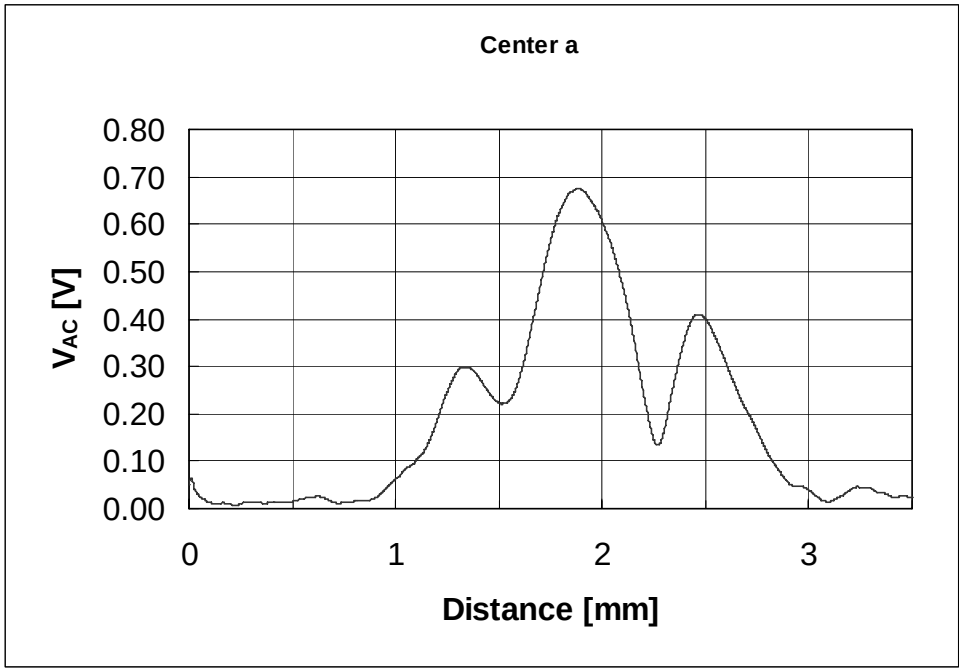


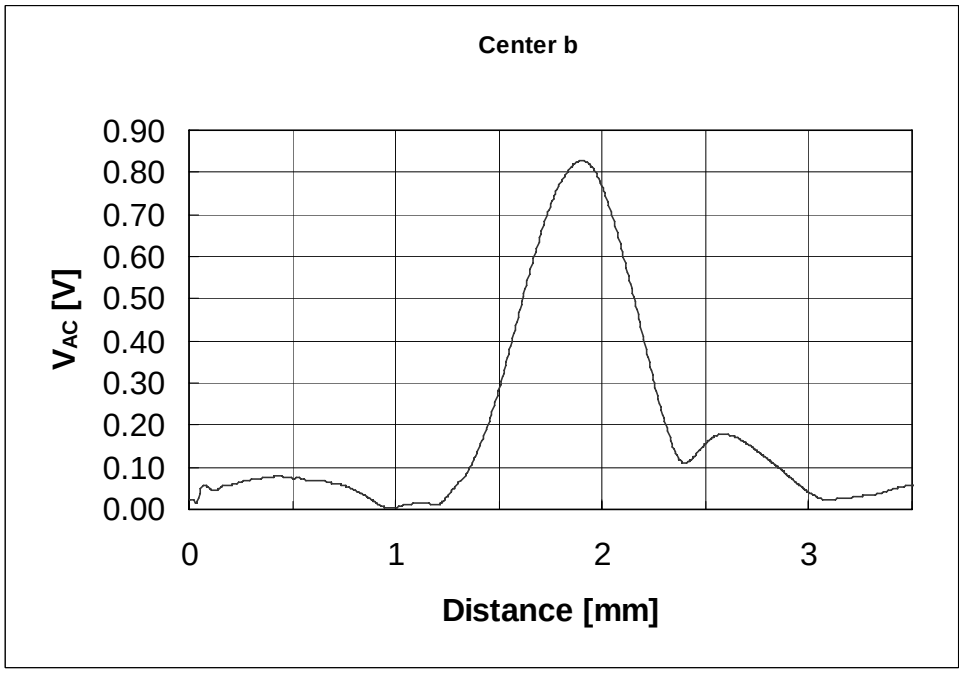
Point #	(x,y) coordinates (in) with respect to the center point	Point name	Alpha (ppm)
1	(0,0)	Center	**1.06**
2	(0, 0.5”)	Top	**1.16**
3	(0, -0.5”)	Bottom	**1.16**
4	(0.5”, 0)	Right	**1.19**
5	(-0.5”, 0)	Left	**1.16**

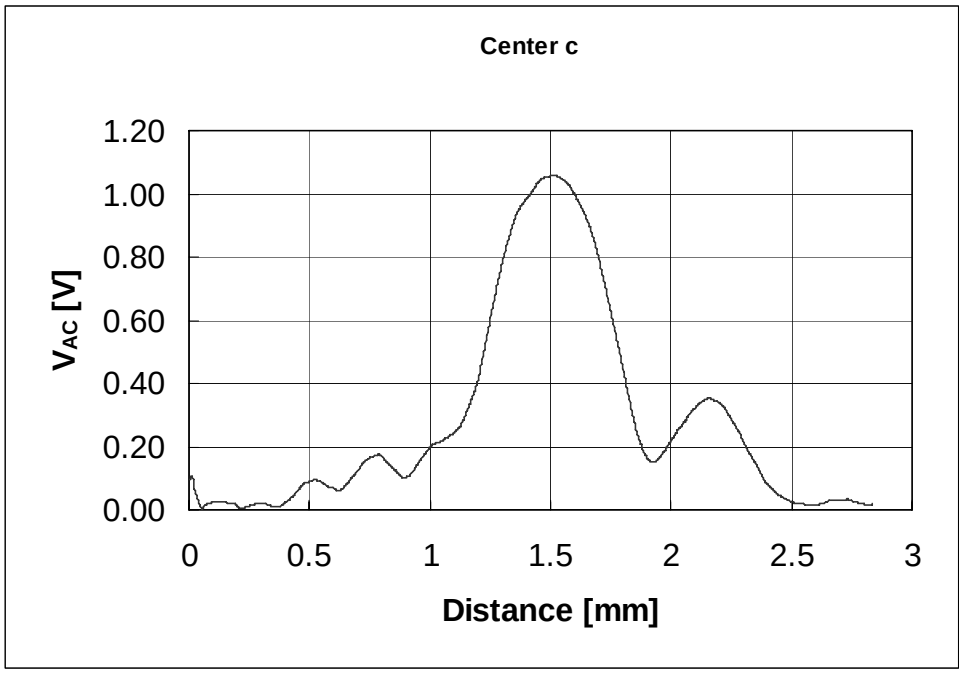
Progression of the point “Center”.

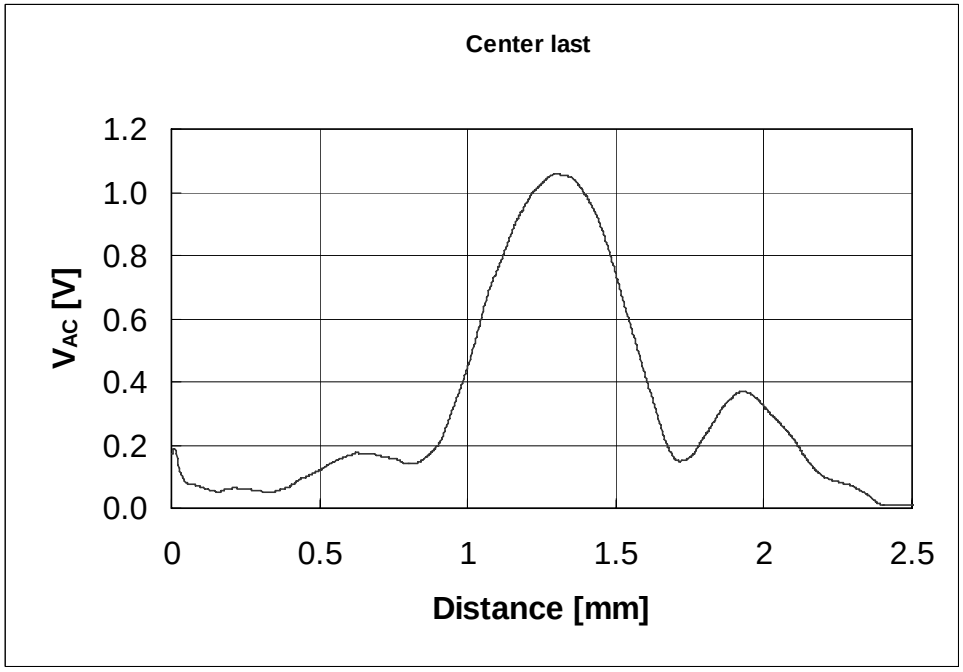
# of measurement	(Alpha (ppm)	
1	0.675	1st measurement
2	0.825	After 30 min
3	1.055	After 1 hour (points 1 to 3 differ ± 0.2 mm)
4	1.06	End of the day
5	1.165	Next day (#3 to 5 are from the same point)

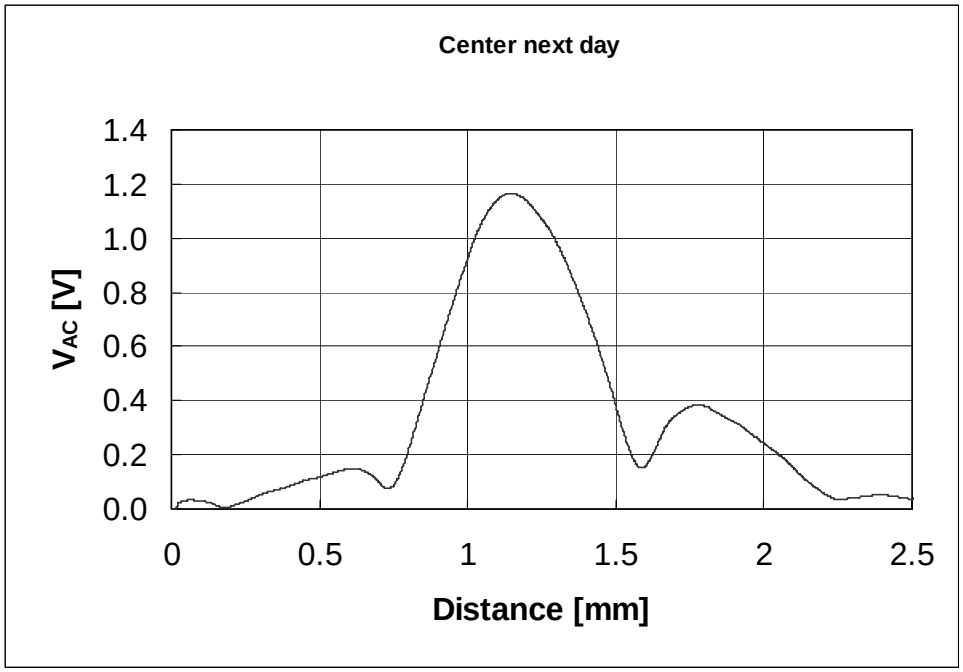
Plots

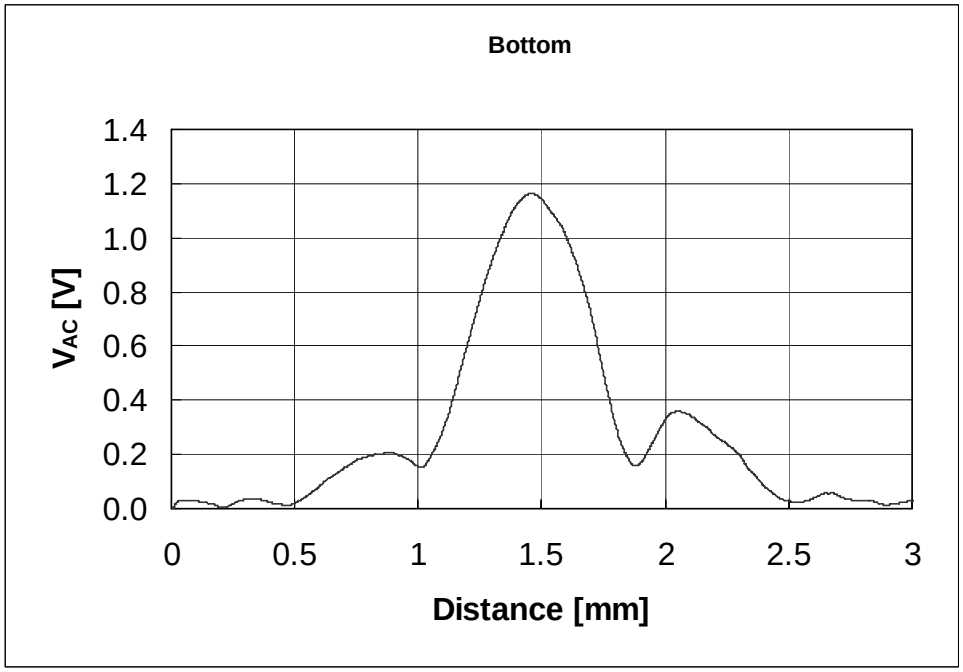

Center a
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
V_{AC} [V]
0
1
2
3
Distance [mm]

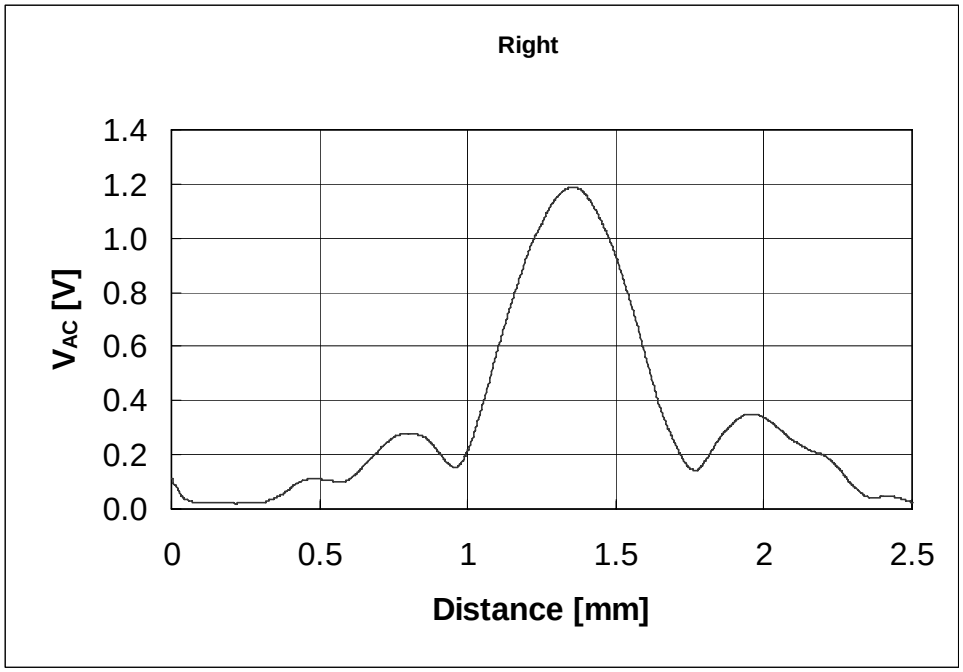

Center b
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
V_{AC} [V]
0
1
2
3
Distance [mm]

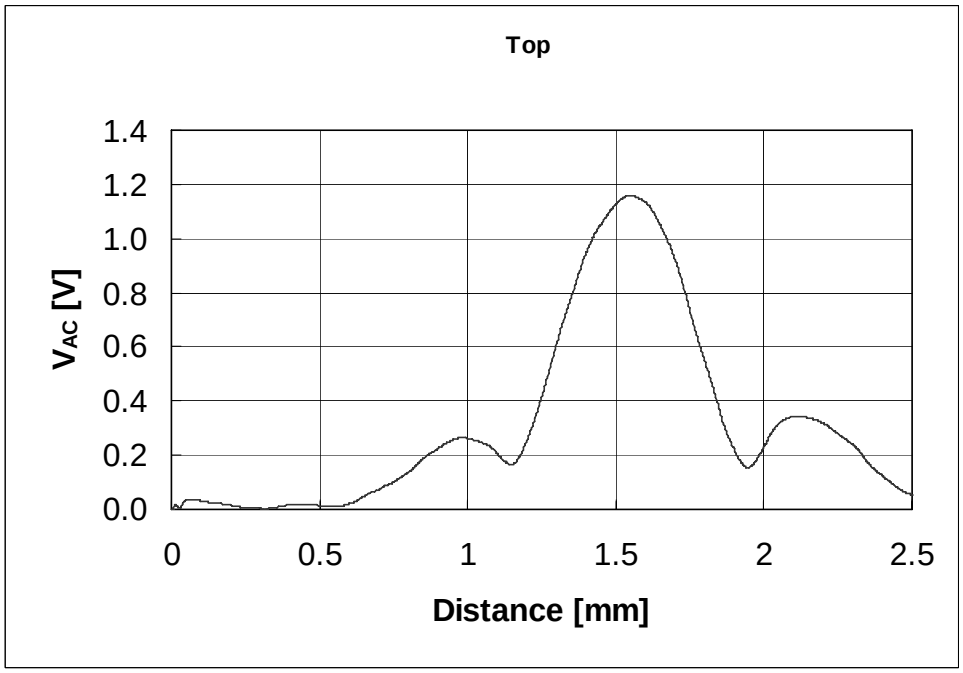

Center c
1.20
1.00
0.80
0.60
0.40
0.20
0.00
V_{AC} [V]
0
0.5
1
1.5
2
2.5
3
Distance [mm]

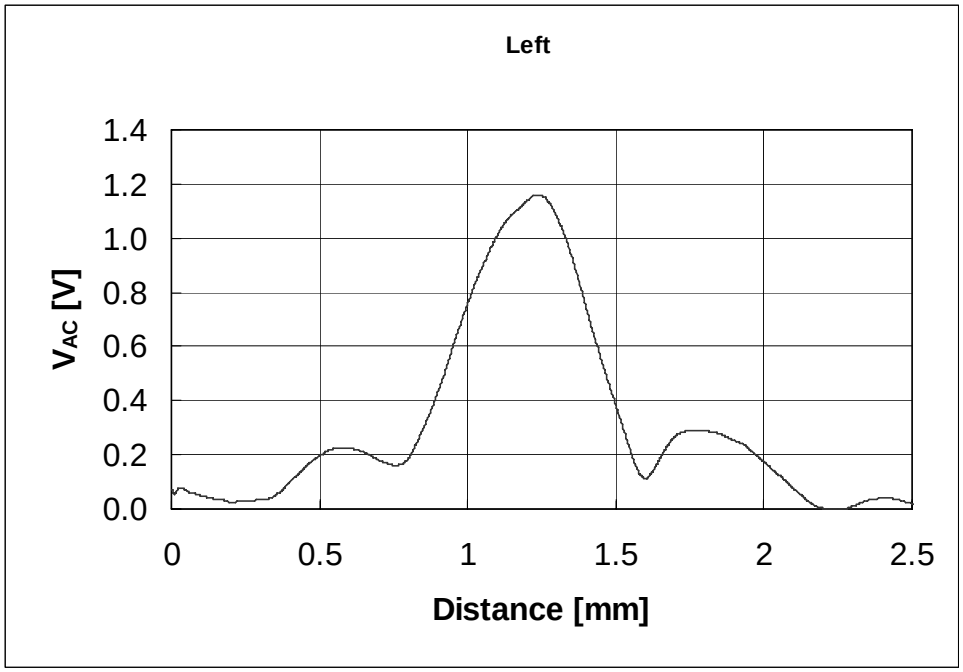

Center last
1.2
1.0
0.8
0.6
0.4
0.2
0.0
V_{AC} [V]
0
0.5
1
1.5
2
2.5
Distance [mm]


Center next day
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
V_{AC} [V]
0
0.5
1
1.5
2
2.5
Distance [mm]


Bottom
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
V_{AC} [V]
0
0.5
1
1.5
2
2.5
3
Distance [mm]


Right
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
V_{AC} [V]
0
0.5
1
1.5
2
2.5
Distance [mm]


Top
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
V_{AC} [V]
0
0.5
1
1.5
2
2.5
Distance [mm]



11/07/06

MMT14K04-1

Dear Helena,

I have measured other points on the sample. Some are close to the previous points. The new measurements give similar results as before, though a bit higher. I guess this is because the coating was not covered and remained in the sample holder, on air, for one whole day.

My previous data

Point #	(x,y) coordinates (mm) with respect to the center point	Alpha (ppm)
1	(0, 30)	**1.19**
2	(0, 20)	**1.18**
3	(0, 10)	**1.24**
4	(0, 0)	**1.22 (1.28)** 2 close points
5	(0, -10)	**1.23**
6	(0, -20)	**1.26**
7	(0, -30)	**1.22**
8	(-30, 0)	**1.19**
9	(-20, 0)	**1.13**
10	(-10, 0)	**1.12**
11	(10, 0)	**1.27**
12	(20, 0)	**1.21**
13	(30, 0)	**1.17**

The data right after your departure (center and ± 0.5”)

Point #	(x,y) coordinates (in) with respect to the center point	Point name	Alpha (ppm)
1	(0,0)	Center	**1.06**
2	(0, 0.5”)	Top	**1.16**
3	(0, -0.5”)	Bottom	**1.16**
4	(0.5”, 0)	Right	**1.19**
5	(-0.5”, 0)	Left	**1.16**

The next day data, the optic was not covered (center and ± 1.0”)

Point #	(x,y) coordinates (in) with respect to the center point	Point name	Alpha (ppm)
1	(0,0)	Center	**1.10**
2	(0, 1”)	Top	**1.40**
3	(0, -1”)	Bottom	**1.34**
4	(1”, 0)	Right	**1.51**
5	(-1”, 0)	Left	**1.43**

11/22/06

Hi Helena,
I have re-measured the MMT1404-1 disk. Surprisingly, there was no time dependence.

1) I have coated the optic by "First Contact" and left it coated for two weeks.
2) I removed the coating and mounted the sample in the set up, which was calibrated and aligned in advance.
3) The first z-scan started after about 3 min. Alpha = 1.1 ppm, which is as it must be.
4) Then I have centered on the maximum and started a 30 min t-scan. The value of alpha remained stable and constant.
5) I have scanned another point close to the first one. Aplha = 0.92, which is again within the frame of what we expected.
6) I have aligned the surface and made an x-scan (transversal with respect to the beam) moving the sample by hand very carefully. I thought this way I would be able to catch spikes and points that are far beyond the average value. During this scan, I was able to stop and wait for a while any time the value could be suspicious.
The total length of the scan was 20 mm. I was able to catch one small spike only, which may be a dust. The surface absorption is very even and no considerable change was detected.

Now I would rather assume that the value of 0.75 ppm we measured with you was simply by chance, because the set-up was not warmed up properly.

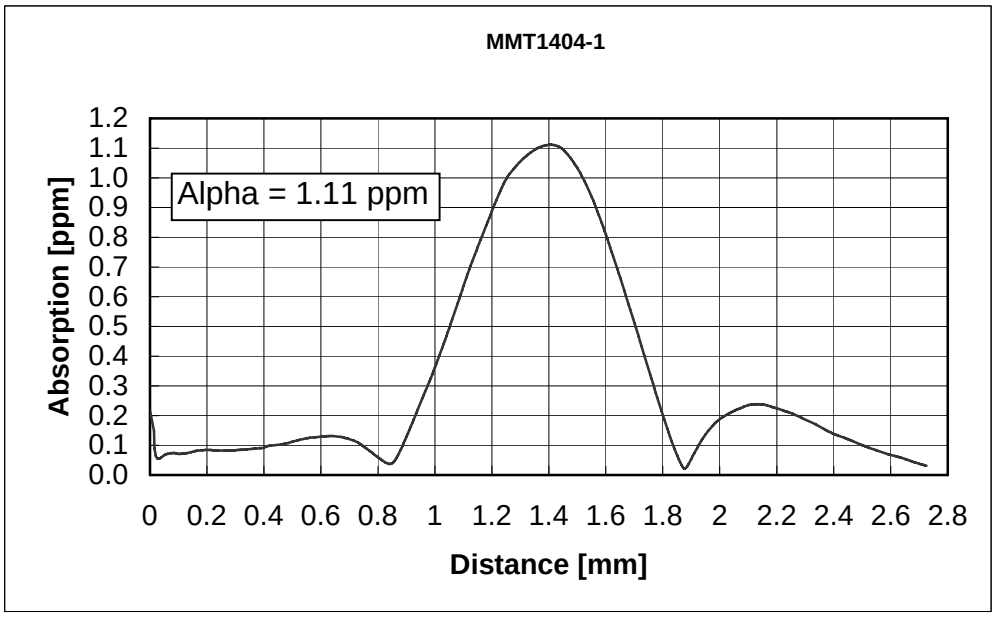
The conclusion is: Alpha = 1.1 in average and varies smoothly from 0.92 up to 1.25 depending on the position. No preference can be given to different parts of the surface. The absolute accuracy is +/- 2.5 % (i.e. +/- 0.025 ppm).

Actually, I do not mind to cover it again and try in a couple of weeks once more. However, I think now that the effect of coating is not that critical.

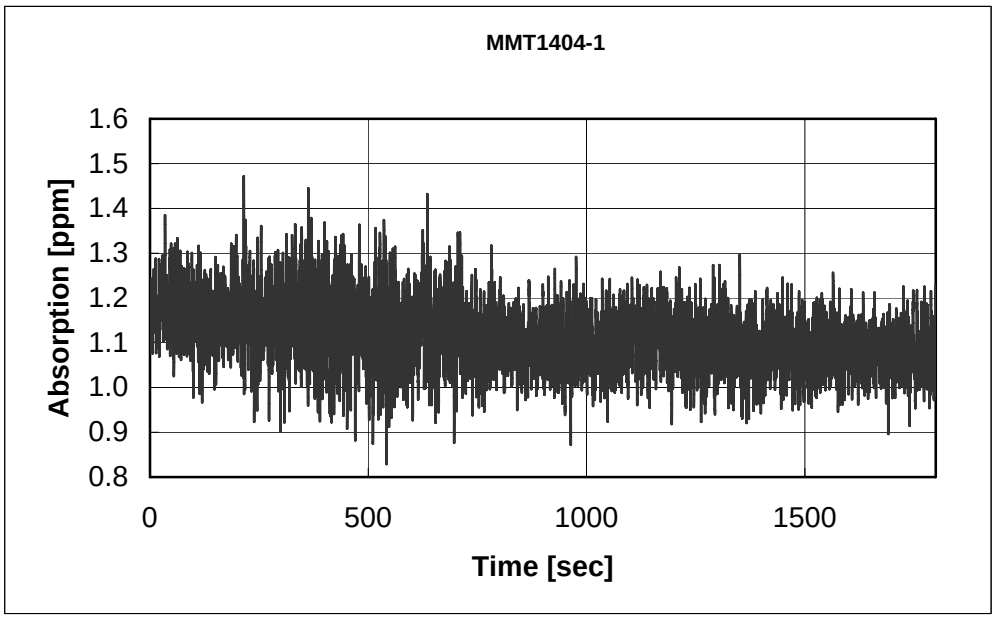
Ashot.

The results are given below.

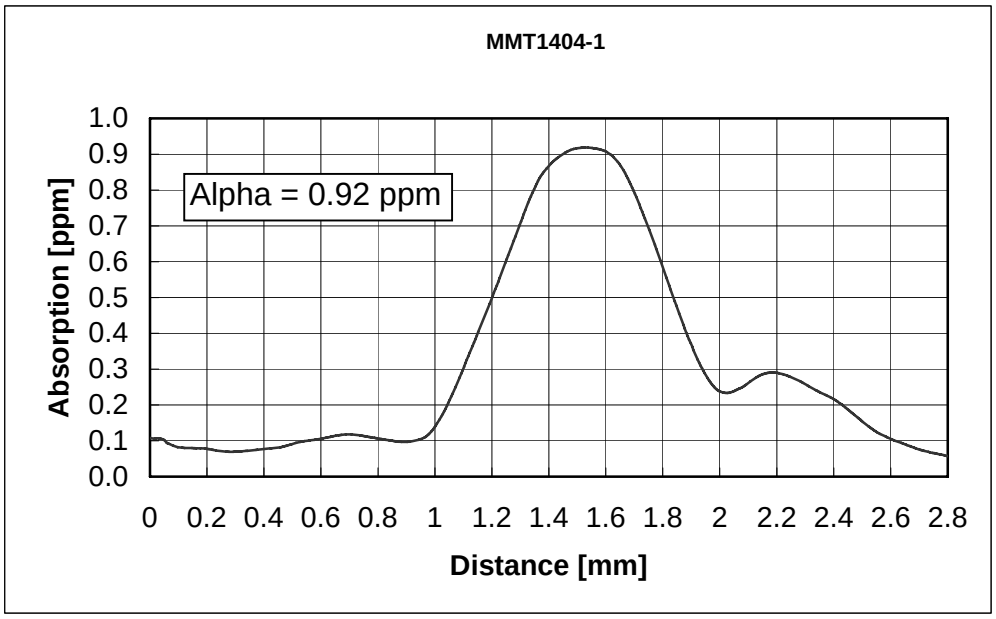
Central point (z-scan (longitudinal)



t-scan of the central point (Alpha ≈ 1.1 ppm).



10 mm left from center



Hand manipulated transversal x-scan (horizontal central line). The total length is 20 mm. Alpha slightly varies from 1.15 to 1.25. One "spike" was observed with Alpha = 2.9 ppm)