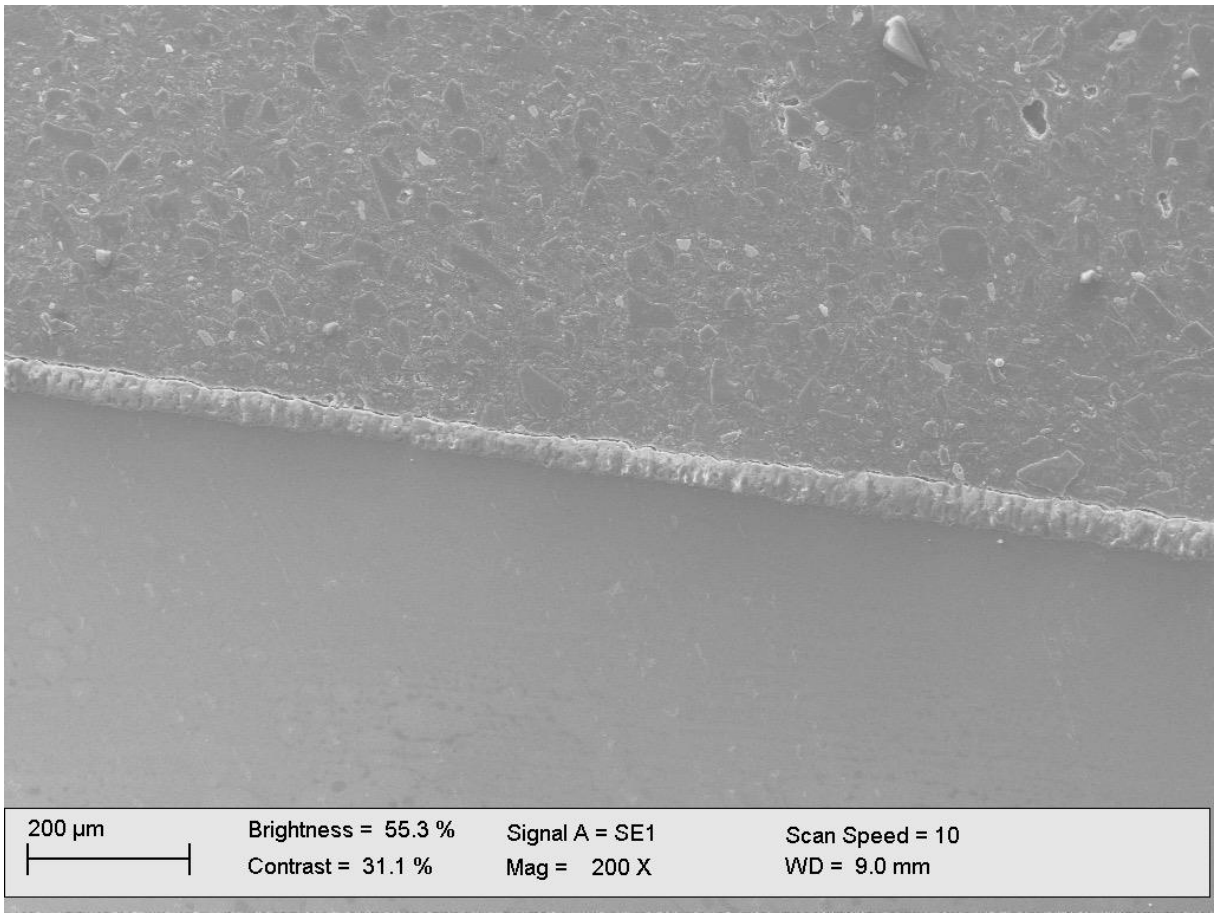
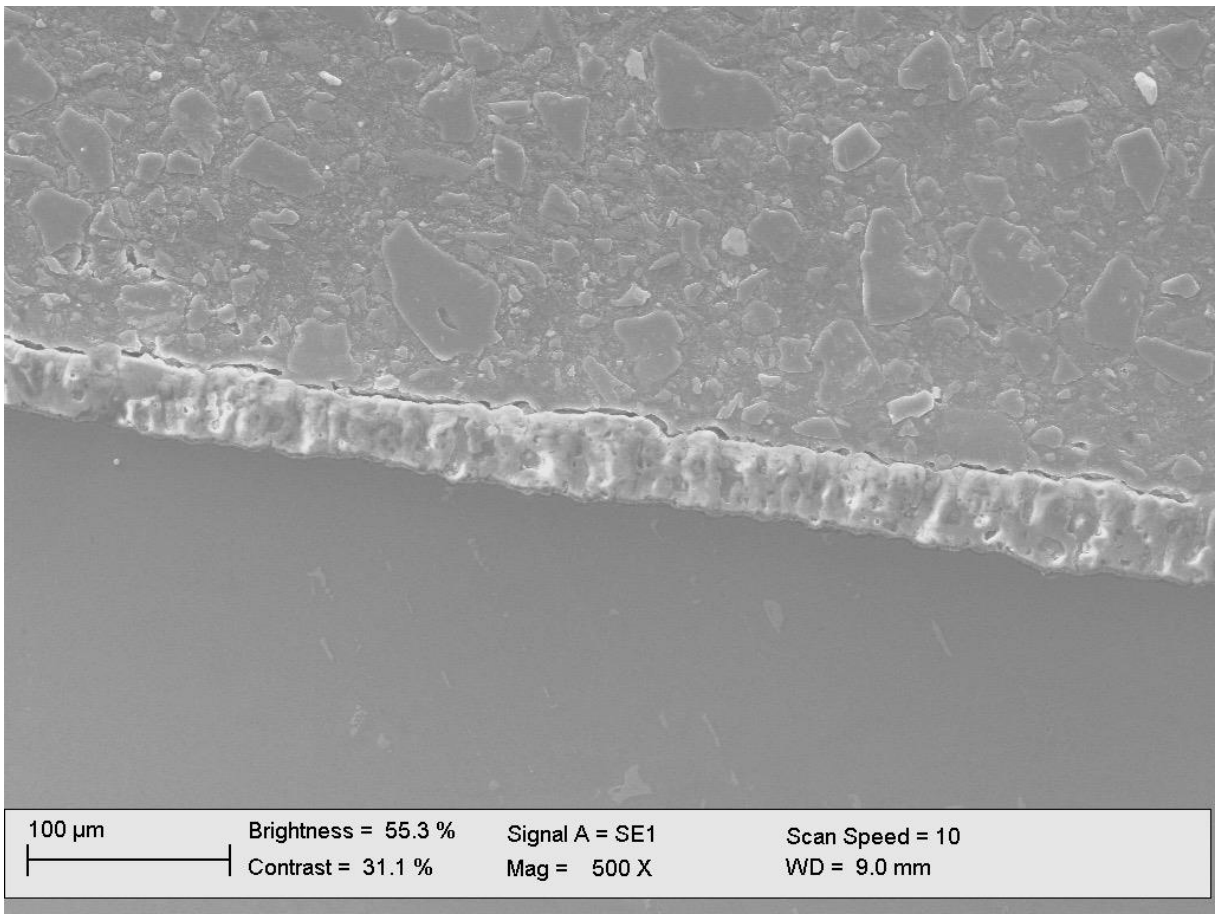
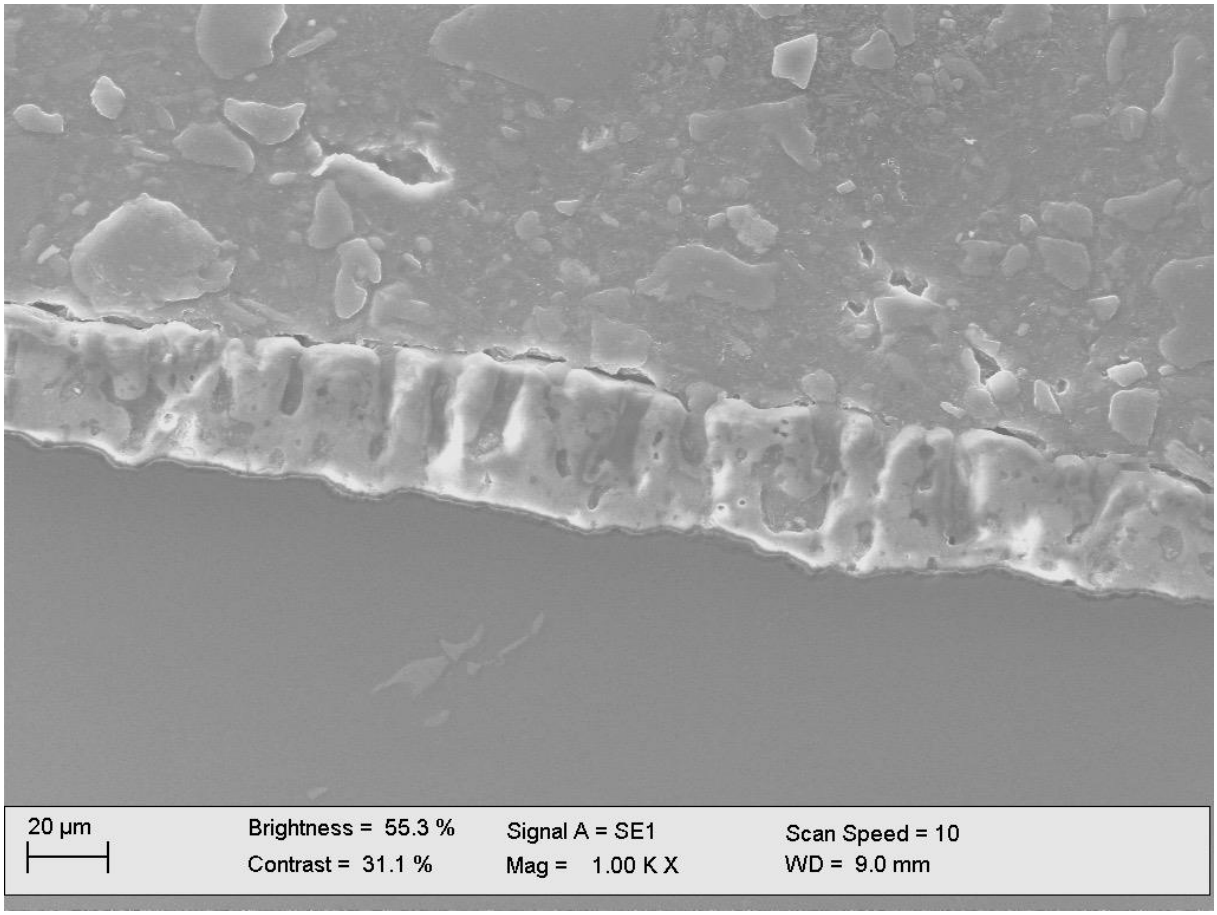
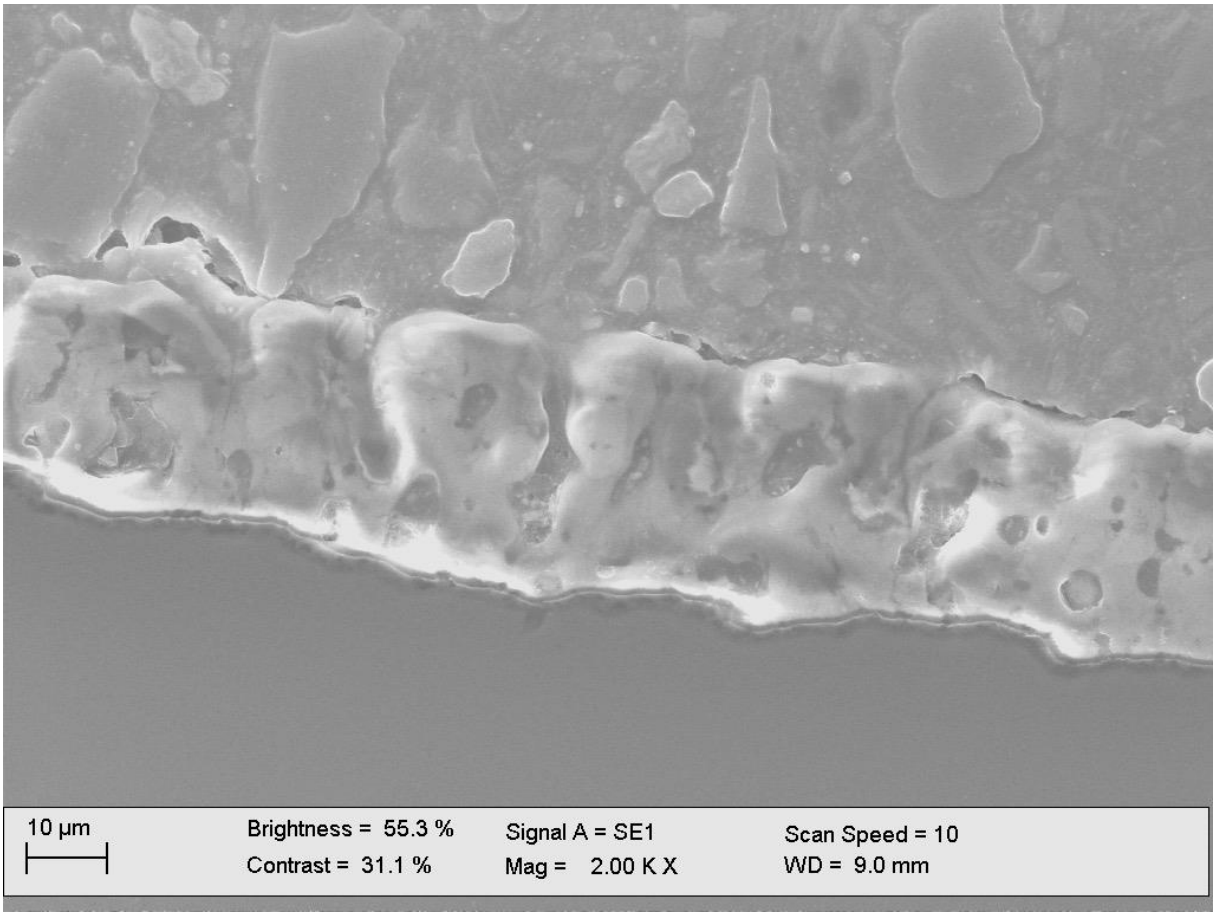
Příloha č.1

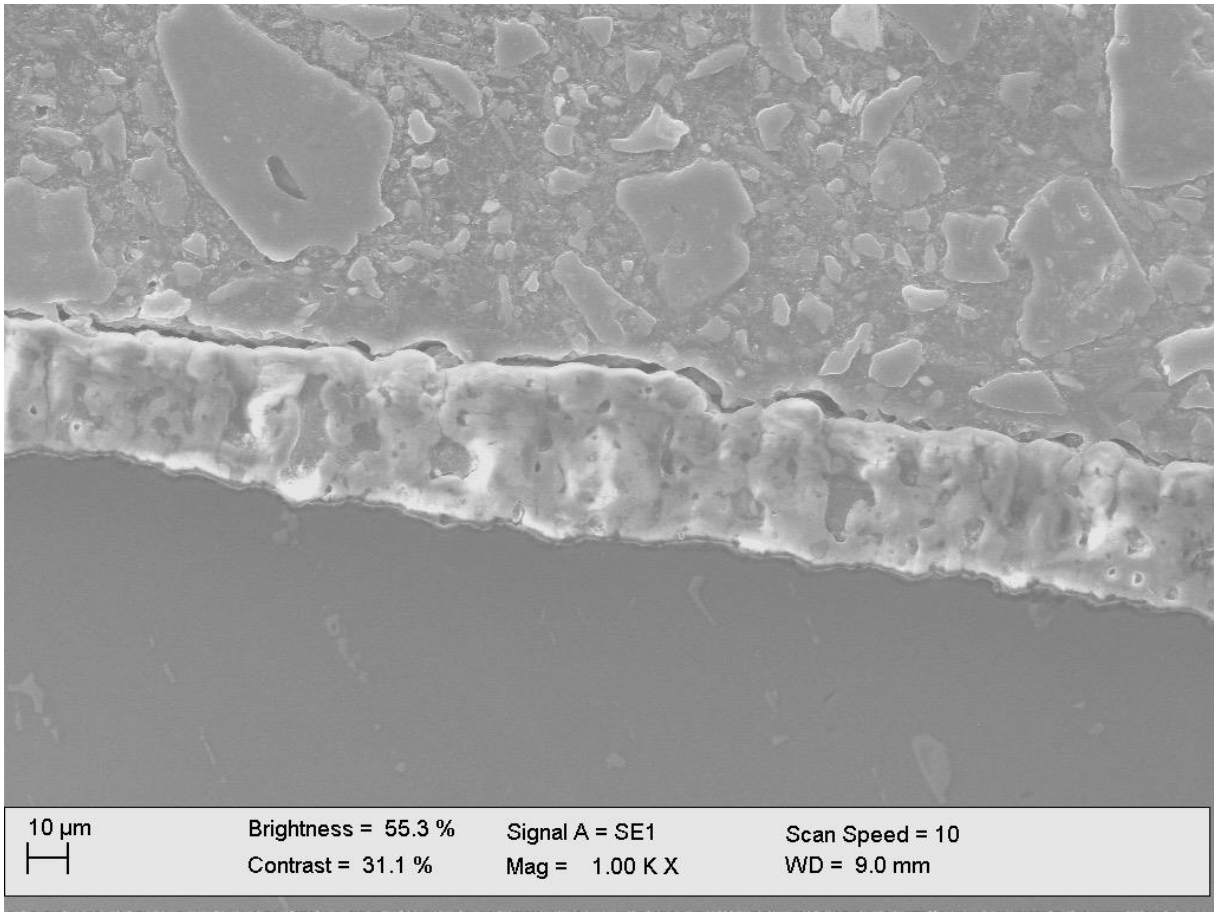
Skenovací elektronová mikroskopie
a
Optická odrazová mikroskopie
Vrstev plasmové elektrolytické oxidace

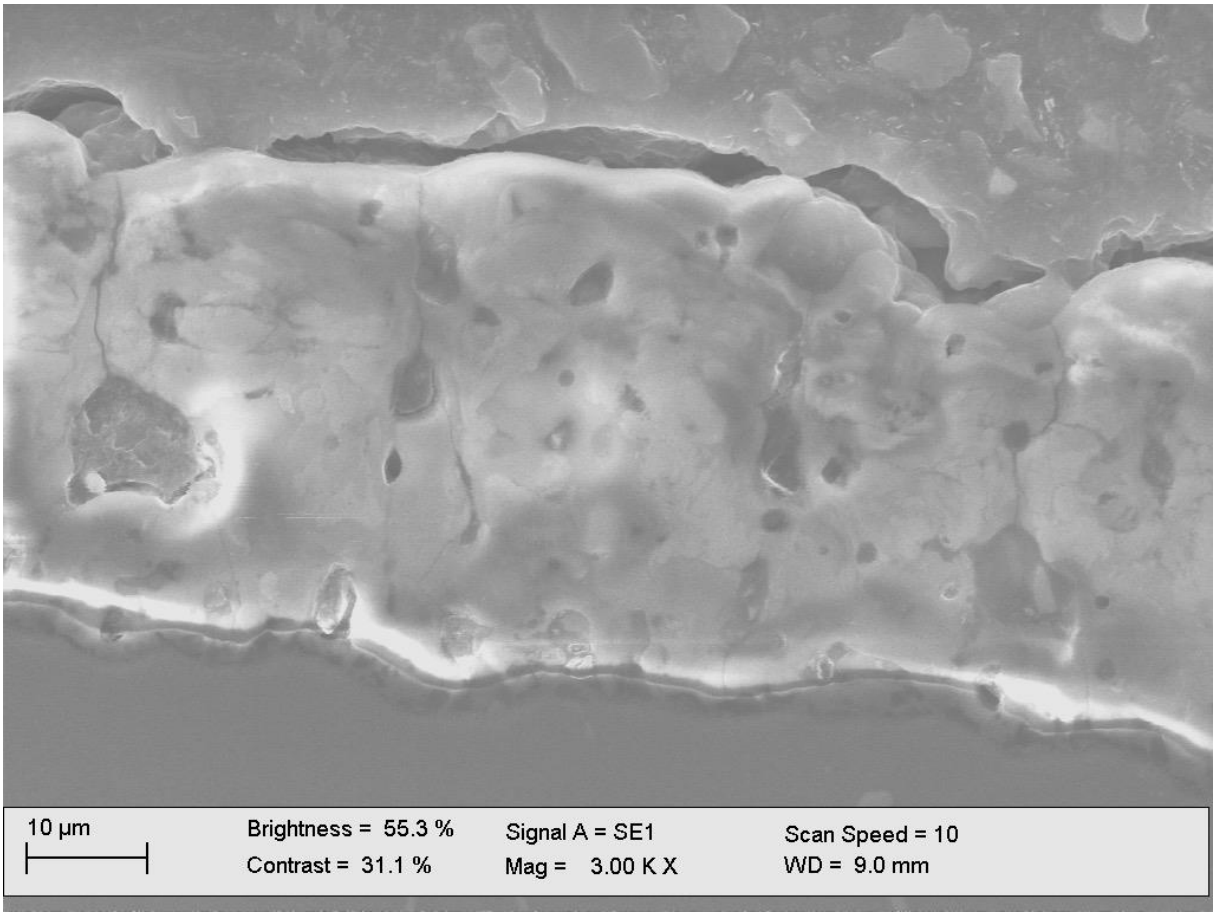

200 µm
Brightness = 55.3 %
Contrast = 31.1 %
Signal A = SE1
Mag = 200 X
Scan Speed = 10
WD = 9.0 mm

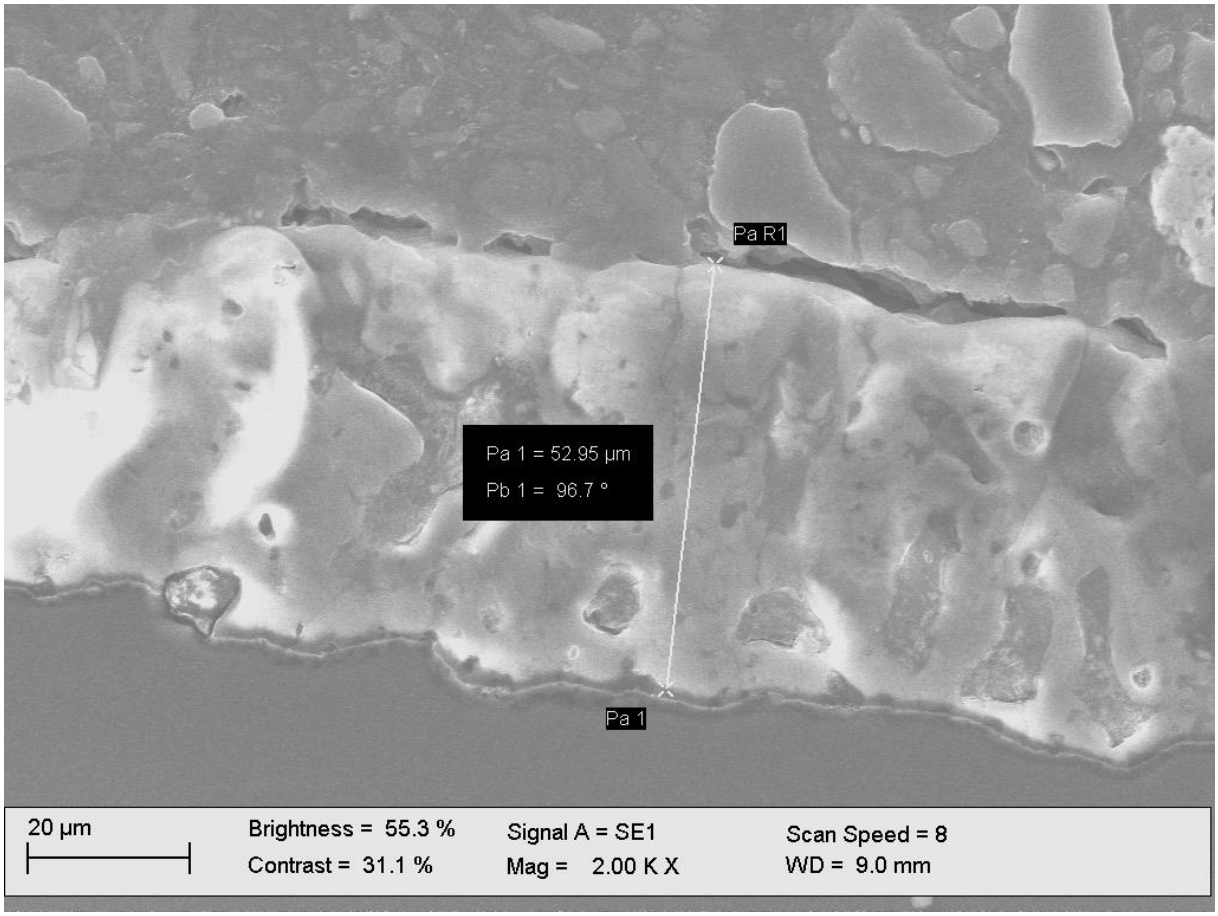

100 µm
Brightness = 55.3 %
Contrast = 31.1 %
Signal A = SE1
Mag = 500 X
Scan Speed = 10
WD = 9.0 mm

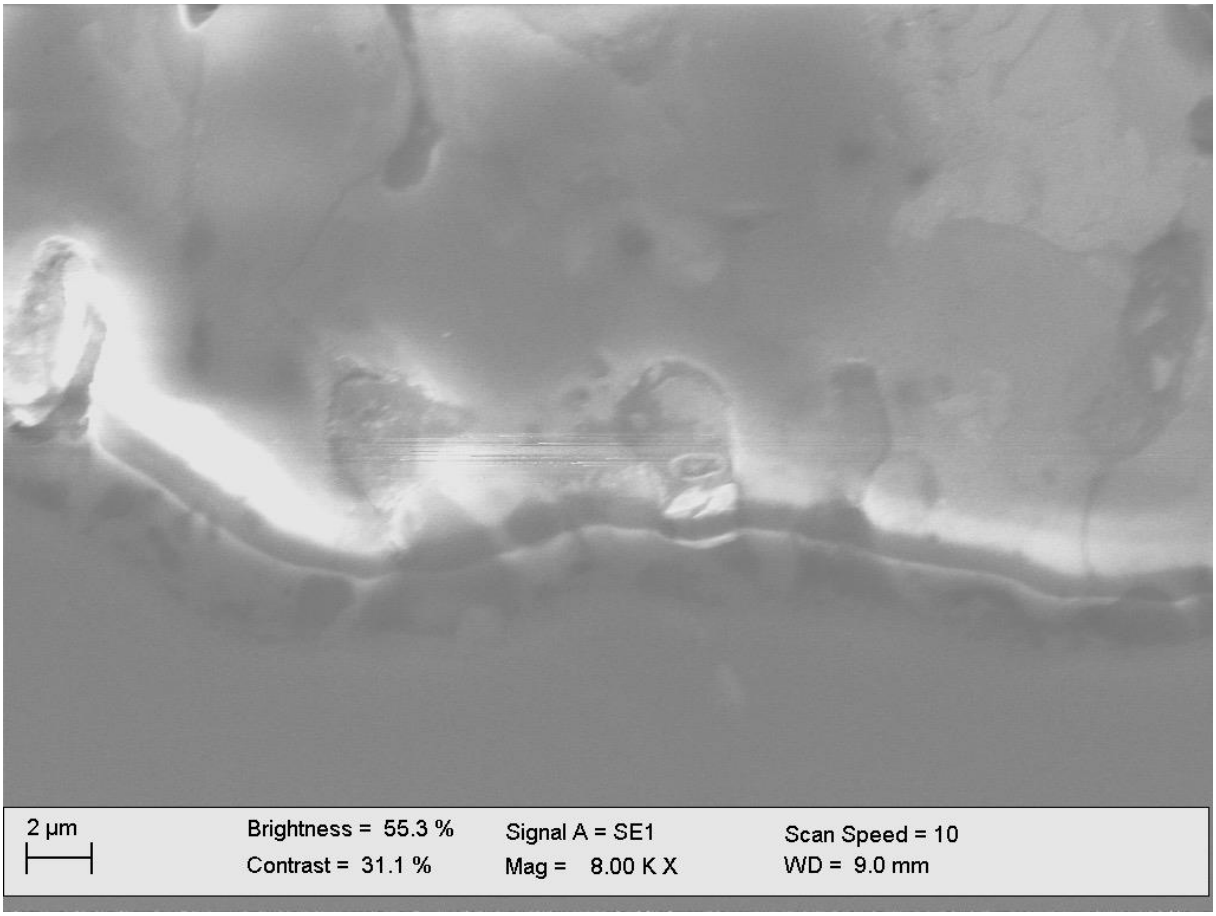

20 µm
Brightness = 55.3 %
Contrast = 31.1 %
Signal A = SE1
Mag = 1.00 K X
Scan Speed = 10
WD = 9.0 mm

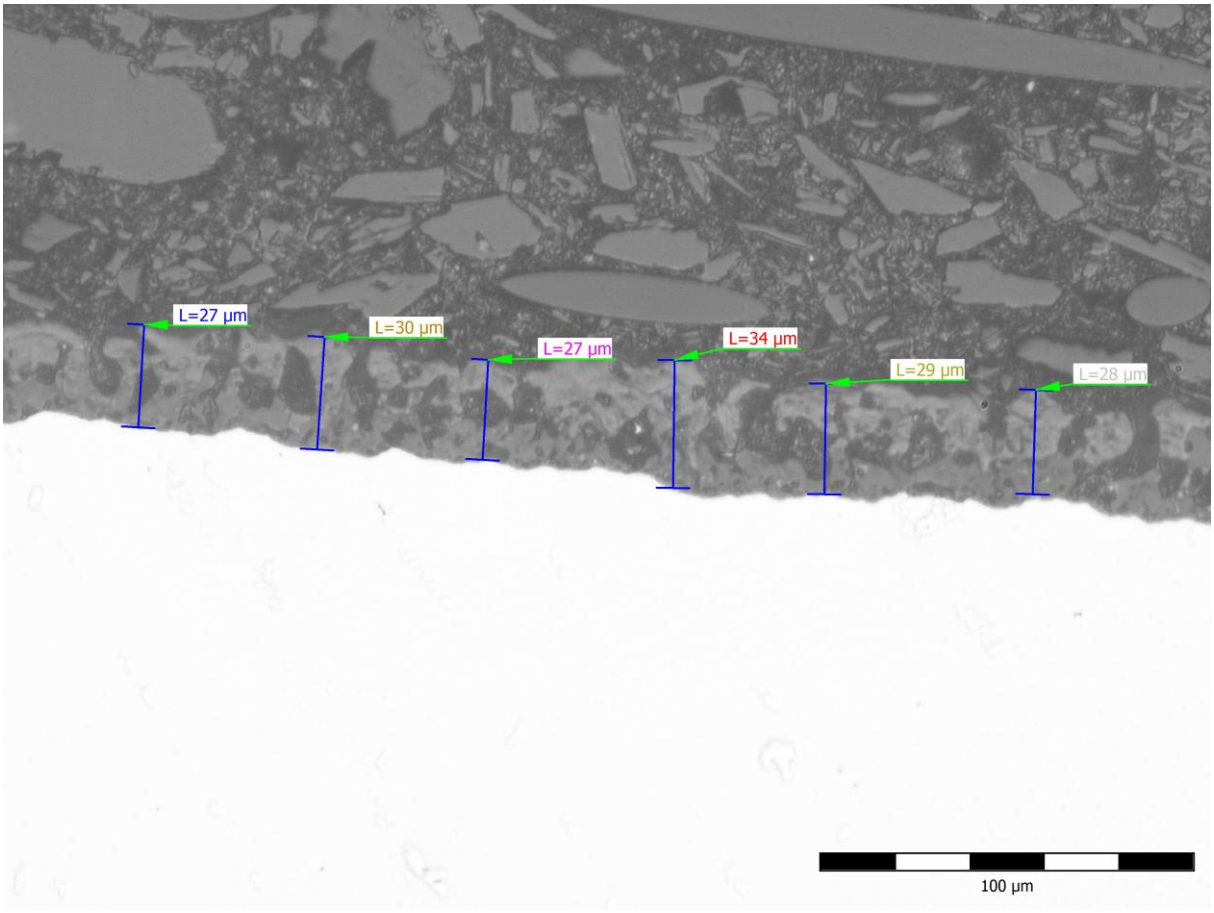

10 µm
Brightness = 55.3 %
Contrast = 31.1 %
Signal A = SE1
Mag = 2.00 K X
Scan Speed = 10
WD = 9.0 mm

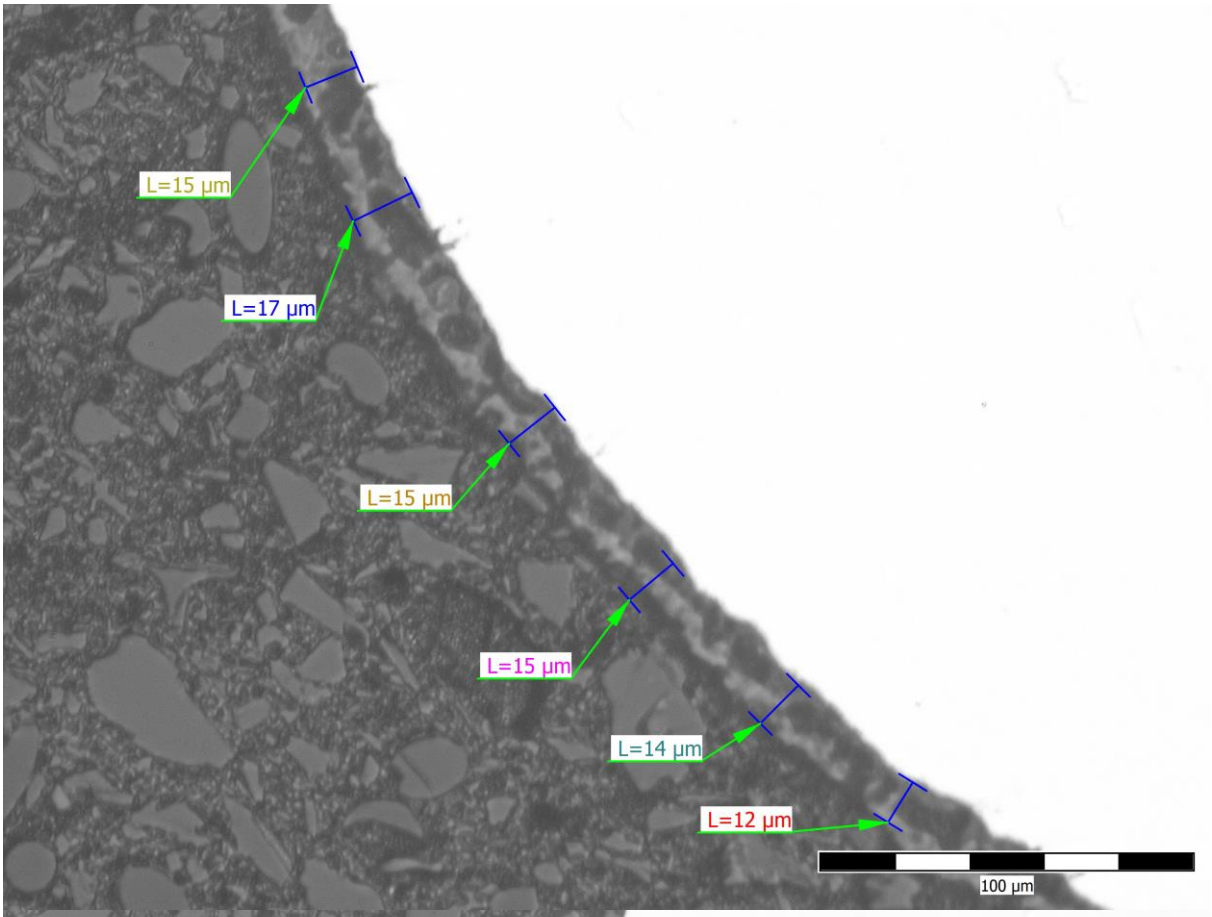

10 µm
Brightness = 55.3 %
Contrast = 31.1 %
Signal A = SE1
Mag = 1.00 K X
Scan Speed = 10
WD = 9.0 mm

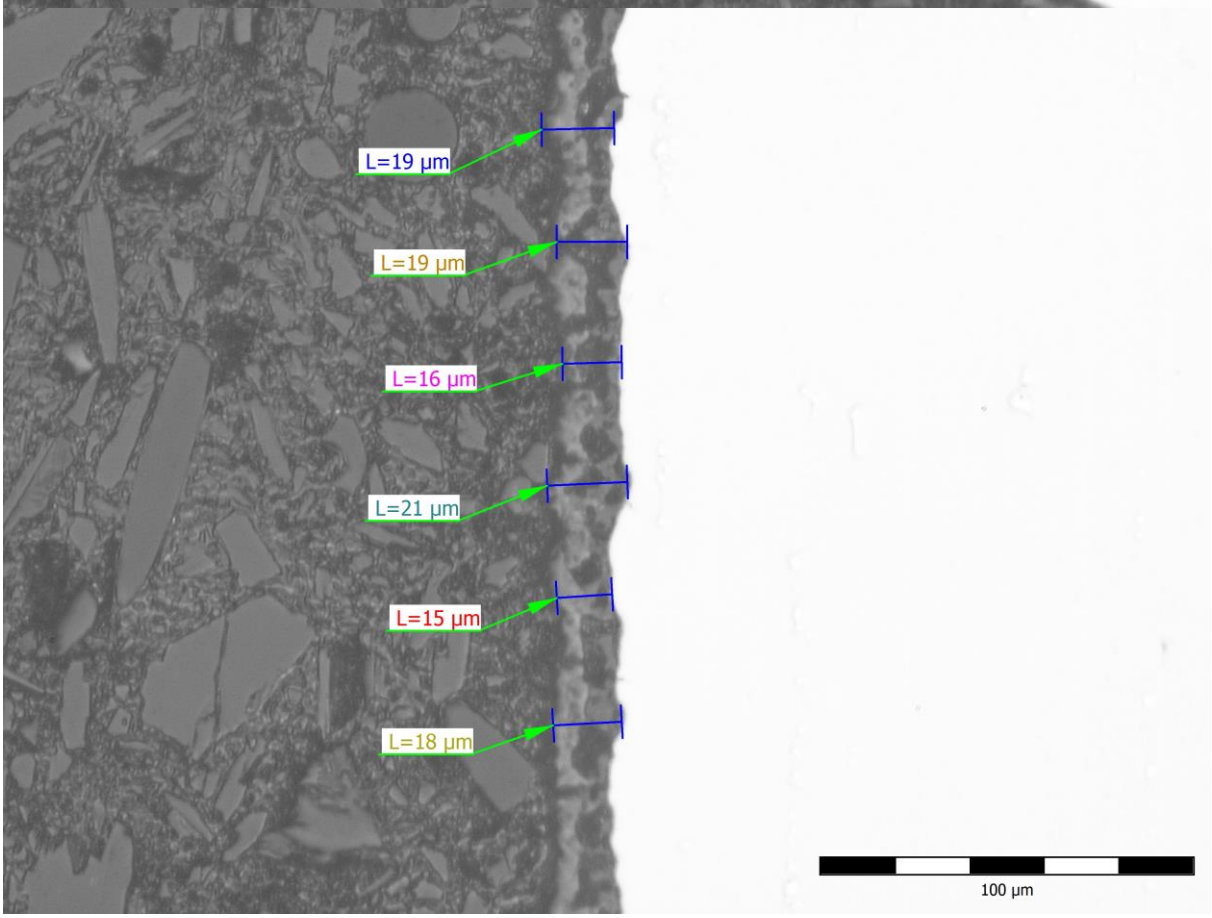

10 µm
Brightness = 55.3 %
Contrast = 31.1 %
Signal A = SE1
Mag = 3.00 K X
Scan Speed = 10
WD = 9.0 mm

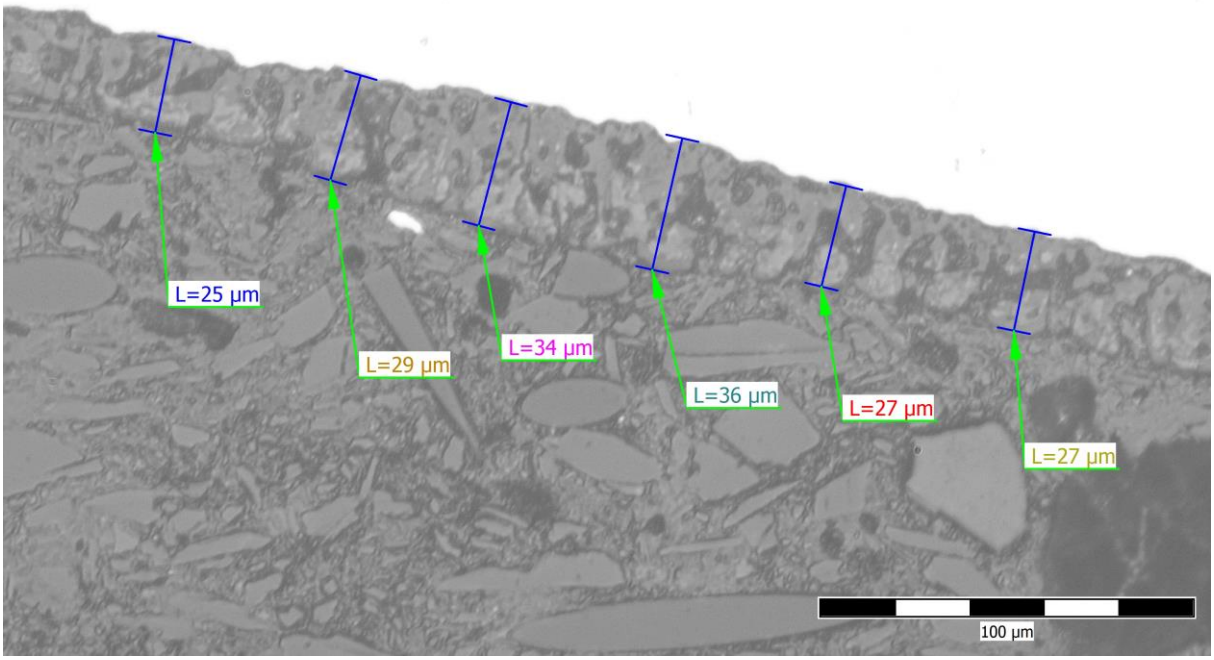

Pa R1
Pa 1 = 52.95 µm
Pb 1 = 96.7 °
Pa 1
20 µm
Brightness = 55.3 %
Contrast = 31.1 %
Signal A = SE1
Mag = 2.00 K X
Scan Speed = 8
WD = 9.0 mm

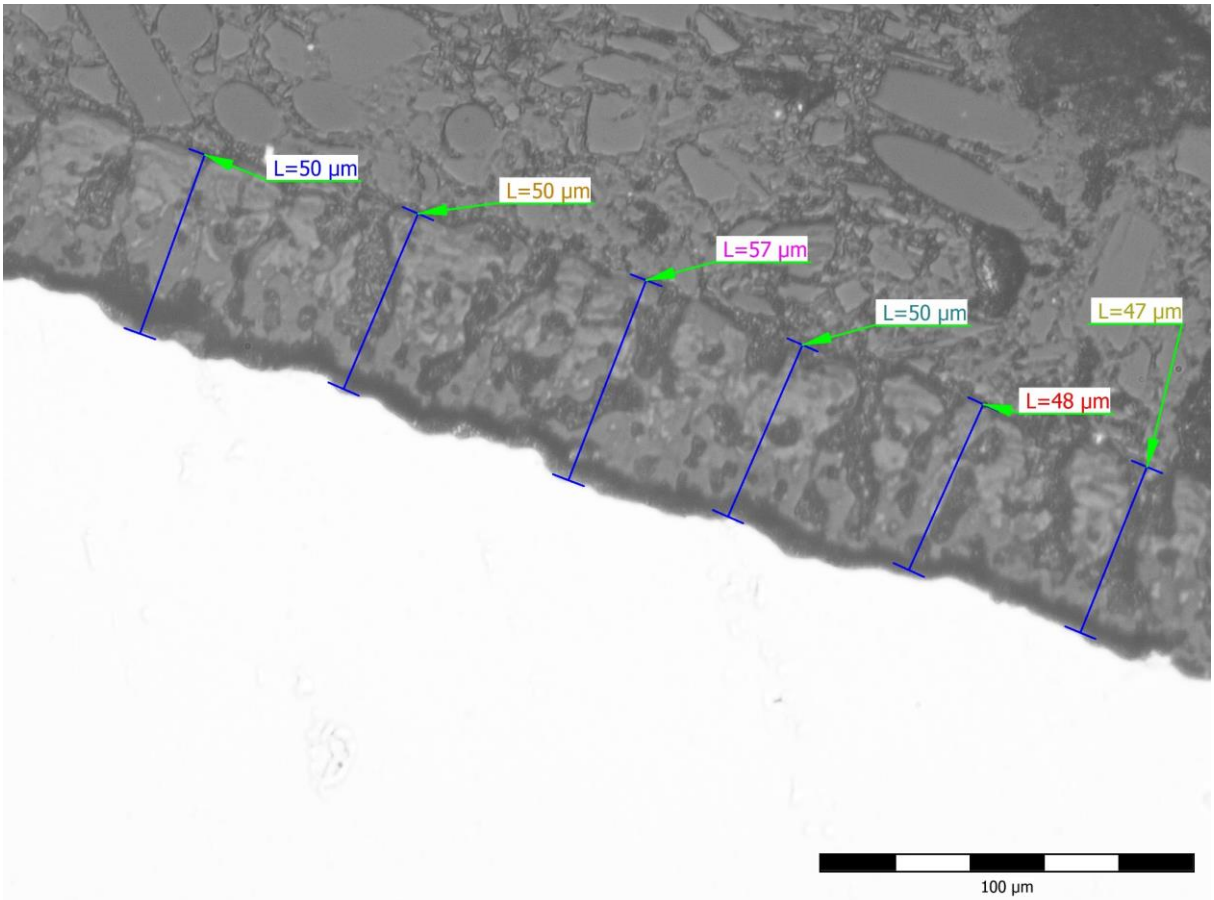

2 µm
Brightness = 55.3 %
Contrast = 31.1 %
Signal A = SE1
Mag = 8.00 K X
Scan Speed = 10
WD = 9.0 mm

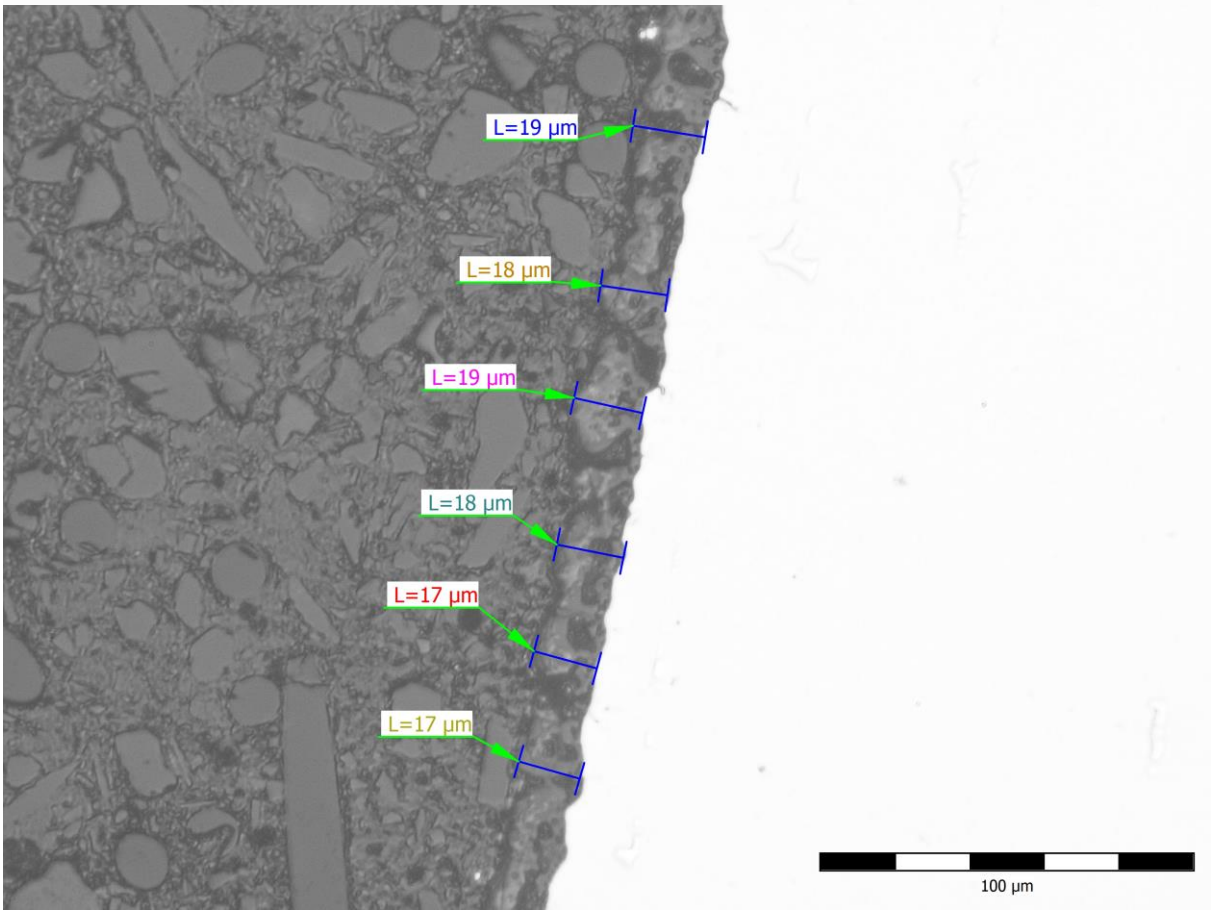

L=27 µm
L=30 µm
L=27 µm
L=34 µm
L=29 µm
L=28 µm
100 µm


L=15 µm
L=17 µm
L=15 µm
L=15 µm
L=14 µm
L=12 µm
100 µm


L=19 µm
L=19 µm
L=16 µm
L=21 µm
L=15 µm
L=18 µm
100 µm


L=25 µm
L=29 µm
L=34 µm
L=36 µm
L=27 µm
L=27 µm
100 µm


L=50 µm
L=50 µm
L=57 µm
L=50 µm
L=47 µm
L=48 µm
100 µm


L=19 µm
L=18 µm
L=19 µm
L=18 µm
L=17 µm
L=17 µm
100 µm

Příloha č.2

Měření nanotvrdosti

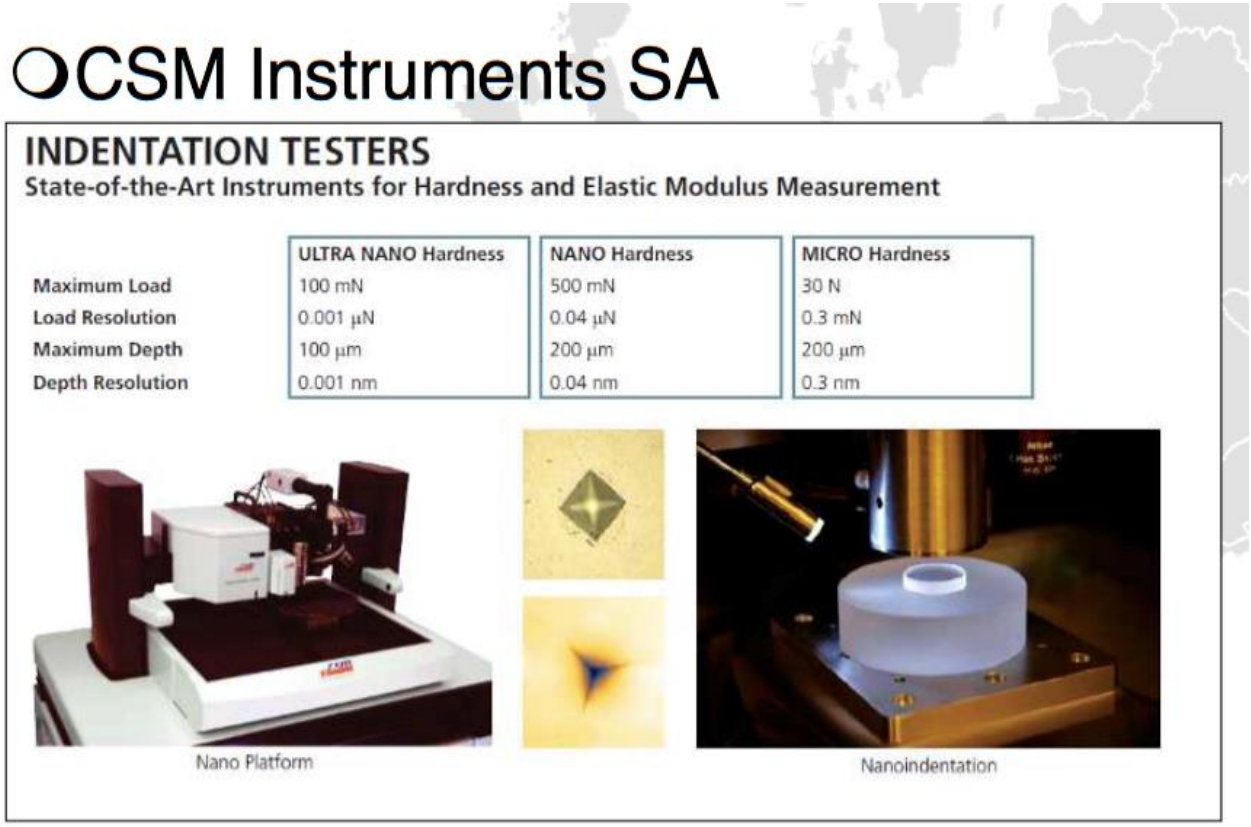
Vrstev plasmové elektrolytické oxidace

Indent	Cycle	Max. Depth (nm)	Plastic Depth (nm)	Max. Load (mN)	Hardness (GPa)	Er (GPa)	ERP	Contact Compliance (nm/mN)	Plastic Work (nJ)	Elastic Work (nJ)	Fit MSE
1	1	1044,274	815,869	50,04999	2,96002	34,25545	0,279953	6,084712	15,4396	9,969829	0,042127
2	1	1750,078	1629,434	50,04999	0,843657	34,62301	0,07404	3,21396	23,40014	6,136704	0,148123
3	1	691,6298	559,9762	50,04999	5,871664	83,70189	0,235106	3,507258	9,476153	6,096323	0,091979
4	1	530,4966	388,2113	50,04999	11,32926	107,5792	0,366515	3,790487	5,76977	5,499736	0,006763
5	1	567,8344	435,0597	50,04999	9,248308	104,1606	0,305187	3,537123	6,343992	5,000553	0,007076
6	1	584,9516	416,7028	50,04999	9,988245	85,42408	0,403762	4,482153	5,65624	7,301078	2,127314
7	1	553,2105	405,6693	50,04999	10,47732	99,7699	0,363698	3,930502	5,791903	5,815204	0,006838
8	1	577,8824	446,6947	50,04999	8,82175	102,9608	0,293685	3,494845	5,938271	5,049462	0,007942
9	1	1699,197	1603,217	50,04999	0,868477	44,15548	0,059867	2,55692	20,45243	4,604556	0,193778
10	1	711,7499	583,0392	50,04999	5,457642	82,54215	0,220758	3,428855	8,977779	5,736597	0,015744
11	1	1325,638	1191,682	50,04999	1,483368	41,34765	0,112409	3,568584	24,12047	6,495313	0,387485
12	1	1000,553	902,1676	50,04999	2,463537	72,54965	0,109055	2,620998	6,8306	4,59693	0,077029
13	1	1057,492	863,6403	50,04999	2,667906	38,31801	0,224459	5,16422	18,50069	8,623805	0,810161
14	1	1309,963	1096,611	50,04999	1,725577	27,99991	0,194557	5,683723	22,02026	9,354905	0,027081
15	1	1529,018	1382,459	50,04999	1,133484	33,03566	0,106013	3,904336	17,78719	7,473518	0,816695
16	1	1580,861	1430,244	50,04999	1,066093	31,17521	0,105309	4,012459	15,16261	7,042011	0,013211
17	1	3335,252	3097,196	50,04999	0,280143	10,1111	0,076862	6,34182	42,56022	12,77791	1,394861
18	1	1278,658	929,0553	50,04999	2,334919	19,87693	0,376299	9,313415	6,146805	15,86923	0,331681
19	1	2568,885	2306,523	50,04999	0,45831	11,73455	0,113748	6,989331	56,17724	13,70546	0,188799
20	1	1985,657	1771,001	50,04999	0,727353	18,06832	0,121206	5,718436	27,74536	9,941004	0,112315

MMA (PEO) Layer Hardness

Min	Max	Avg.	Hardness
5,871664	11,32926	9,289425	Gpa
598,7217	1155,222	947,224	HV

Device:



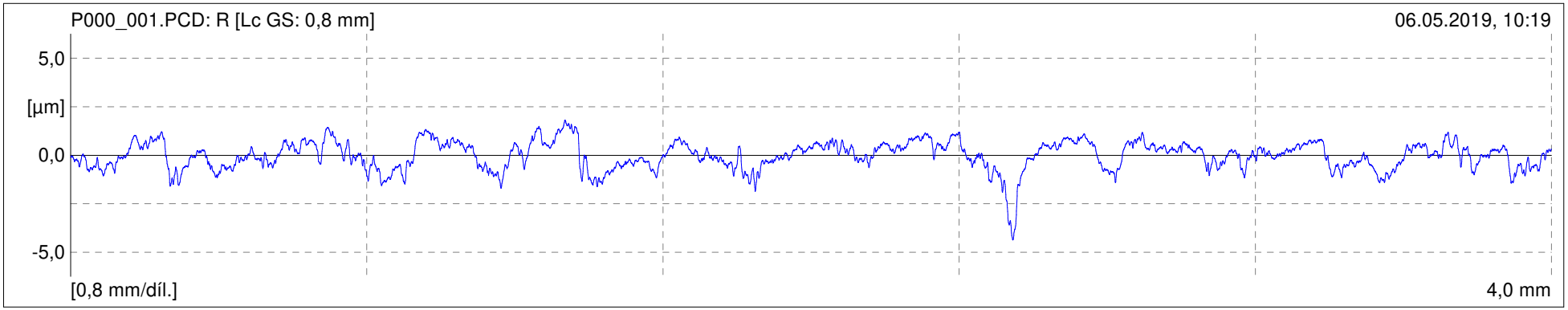
Příloha č.3

Profilometrie
Vrstev anodické oxidace

Mahr	**SVÚM a.s.** Oddělení polymerů a technologie fluroplastů Tovární 2053 Čelákovice	**PS1** Explorer [v1.20-07]

Objekt:	Anodická oxidace - dekorativní
Číslo:	01
Komentář:	0°

Lt:	5,60 mm
Ls:	2,5 µm
VB:	350 µm
Vt:	0,50 mm/s
Body:	11200
Snímač:	PHT 350

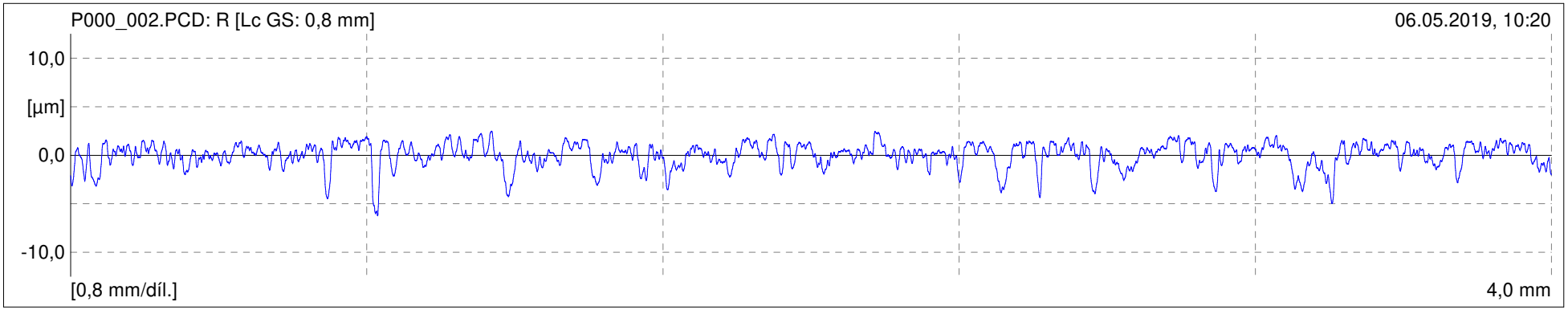


Ra	0,572	µm	Rq	0,729	µm	Rz	3,56	µm
RzJ	2,10	µm	Rmax	5,56	µm	Rp	1,37	µm
Rpm	1,81	µm	Rpk	0,38	µm	Rk	1,82	µm
Rvk	0,99	µm	Mr1	5,49	%	Mr2	86,3	%
A1	10,49	µm2/mm	A2	68,0	µm2/mm	Vo	0,007	mm3/µm2
Rt	6,18	µm	R3z	2,34	µm	RSm	218	µm
Rsk	-1,030		S	51	µm	R	1,90	µm
Ar	191	µm	Rx	6,2	µm			

Mahr	**SVÚM a.s.** Oddělení polymerů a technologie fluroplastů Tovární 2053 Čelákovice	**PS1** Explorer [v1.20-07]

Objekt:	Anodická oxidace - dekorativní
Číslo:	02
Komentář:	90°

Lt:	5,60 mm
Ls:	2,5 µm
VB:	350 µm
Vt:	0,50 mm/s
Body:	11200
Snímač:	PHT 350



Ra	0,961	µm	Rq	1,275	µm	Rz	6,91	µm
RzJ	3,41	µm	Rmax	8,73	µm	Rp	2,18	µm
Rpm	2,48	µm	Rpk	0,53	µm	Rk	2,51	µm
Rvk	2,46	µm	Mr1	6,59	%	Mr2	82,8	%
A1	17,58	µm2/mm	A2	212,3	µm2/mm	Vo	0,021	mm3/µm2
Rt	8,73	µm	R3z	4,97	µm	RSm	99	µm
Rsk	-1,230		S	33	µm	R	3,46	µm
Ar	110	µm	Rx	8,2	µm			

Mahr

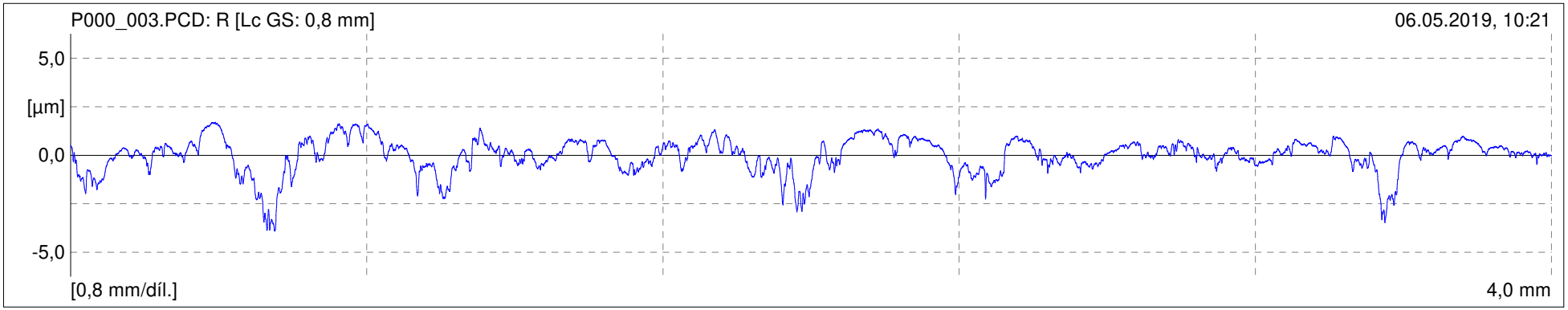
SVÚM a.s.

Oddělení polymerů a technologie fluroplastů
Tovární 2053
Čelákovice

PS1
Explorer [v1.20-07]

Objekt:	Anodická oxidace - tvrdá / funkční
Číslo:	03
Komentář:	0°

Lt:	5,60 mm
Ls:	2,5 µm
VB:	350 µm
Vt:	0,50 mm/s
Body:	11200
Snímač:	PHT 350



Ra	0,645 µm	Rq	0,870 µm	Rz	4,28 µm
RzJ	2,26 µm	Rmax	5,61 µm	Rp	1,33 µm
Rpm	1,70 µm	Rpk	0,45 µm	Rk	1,70 µm
Rvk	1,79 µm	Mr1	7,32 %	Mr2	81,6 %
A1	16,52 µm2/mm	A2	164,1 µm2/mm	Vo	0,016 mm3/µm2
Rt	5,61 µm	R3z	2,62 µm	RSm	306 µm
Rsk	-1,195	S	54 µm	R	2,04 µm
Ar	167 µm	Rx	6,5 µm		

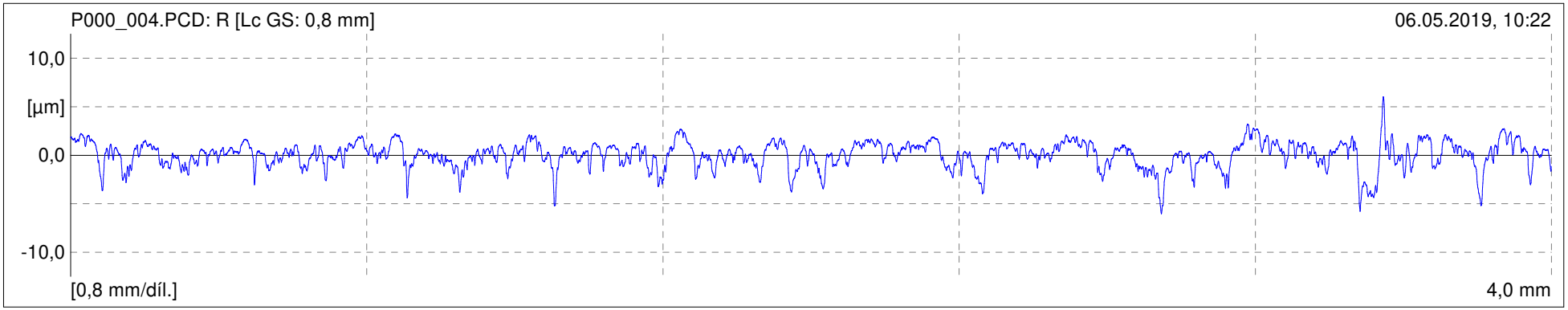
SVÚM a.s.

Oddělení polymerů a technologie fluroplastů
Tovární 2053
Čelákovice

PS1
Explorer [v1.20-07]

Objekt:	Anodická oxidace - tvrdá / funkční
Číslo:	04
Komentář:	90°

Lt:	5,60 mm
Ls:	2,5 µm
VB:	350 µm
Vt:	0,50 mm/s
Body:	11200
Snímač:	PHT 350



Ra	1,028	µm	Rq	1,356	µm	Rz	8,18	µm
RzJ	3,99	µm	Rmax	11,80	µm	Rp	3,27	µm
Rpm	6,04	µm	Rpk	0,92	µm	Rk	2,84	µm
Rvk	2,32	µm	Mr1	8,37	%	Mr2	83,8	%
A1	38,32	µm2/mm	A2	187,3	µm2/mm	Vo	0,019	mm3/µm2
Rt	12,10	µm	R3z	5,37	µm	RSm	124	µm
Rsk	-0,751		S	36	µm	R	4,71	µm
Ar	171	µm	Rx	11,9	µm			

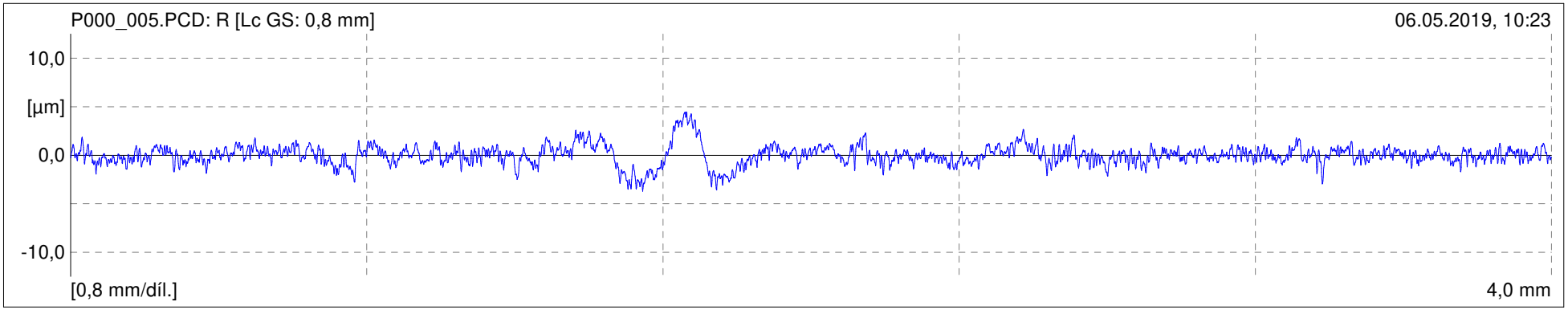
SVÚM a.s.

Oddělení polymerů a technologie fluroplastů
Tovární 2053
Čelákovice

PS1
Explorer [v1.20-07]

Objekt:	Anodická oxidace - PEO
Číslo:	05
Komentář:	0°

Lt:	5,60 mm
Ls:	2,5 µm
VB:	350 µm
Vt:	0,50 mm/s
Body:	11200
Snímač:	PHT 350

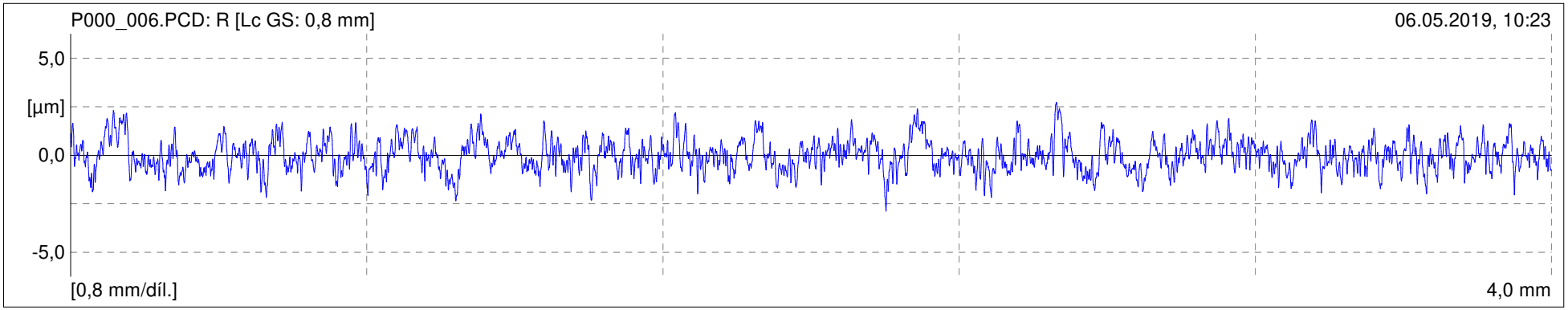


Ra	0,719	µm	Rq	0,998	µm	Rz	5,72	µm
RzJ	2,59	µm	Rmax	8,05	µm	Rp	2,68	µm
Rpm	4,47	µm	Rpk	1,18	µm	Rk	2,00	µm
Rvk	1,88	µm	Mr1	10,50	%	Mr2	87,3	%
A1	62,05	µm2/mm	A2	119,3	µm2/mm	Vo	0,012	mm3/µm2
Rt	8,19	µm	R3z	4,14	µm	RSm	66	µm
Rsk	0,198		S	18	µm	R	2,50	µm
Ar	91	µm	Rx	8,1	µm			

Mahr	**SVÚM a.s.** Oddělení polymerů a technologie fluroplastů Tovární 2053 Čelákovice	**PS1** Explorer [v1.20-07]

Objekt:	Anodická oxidace - PEO
Číslo:	06
Komentář:	90°

Lt:	5,60 mm
Ls:	2,5 µm
VB:	350 µm
Vt:	0,50 mm/s
Body:	11200
Snímač:	PHT 350

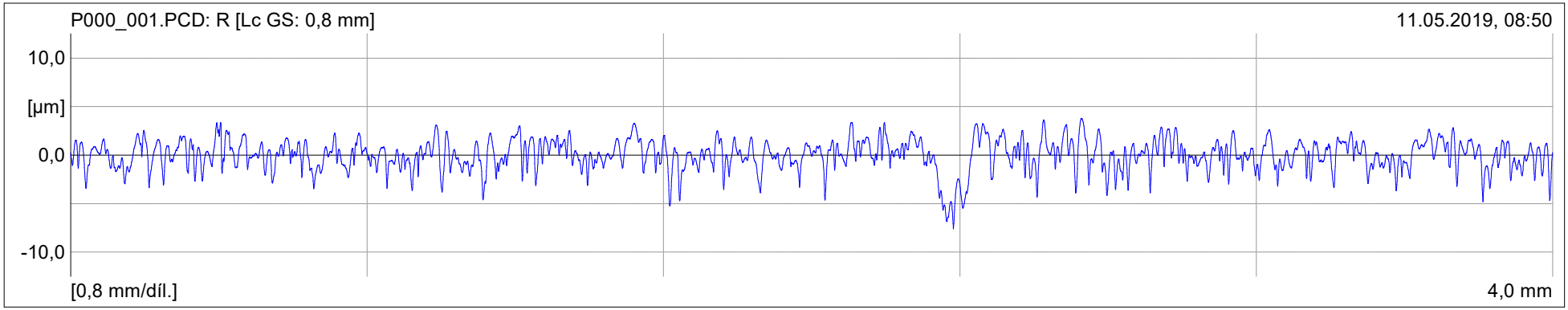


Ra	0,632	µm	Rq	0,800	µm	Rz	4,60	µm
RzJ	2,55	µm	Rmax	5,29	µm	Rp	2,27	µm
Rpm	2,72	µm	Rpk	0,87	µm	Rk	1,99	µm
Rvk	0,74	µm	Mr1	11,50	%	Mr2	90,2	%
A1	50,32	µm2/mm	A2	36,1	µm2/mm	Vo	0,004	mm3/µm2
Rt	5,60	µm	R3z	3,59	µm	RSm	44	µm
Rsk	0,144		S	18	µm	R	3,12	µm
Ar	101	µm	Rx	5,9	µm			

Mahr	**SVÚM a.s.** Oddělení polymerů a technologie fluoroplastů Tovární 2053 Čelákovice	**PS1** Explorer [v1.20-07]

Objekt:	Anodická oxidace - PEO 2
Číslo:	07
Komentář:	0°

Lt:	5,60 mm
Ls:	2,5 µm
VB:	350 µm
Vt:	0,50 mm/s
Body:	11200
Snímač:	PHT 350

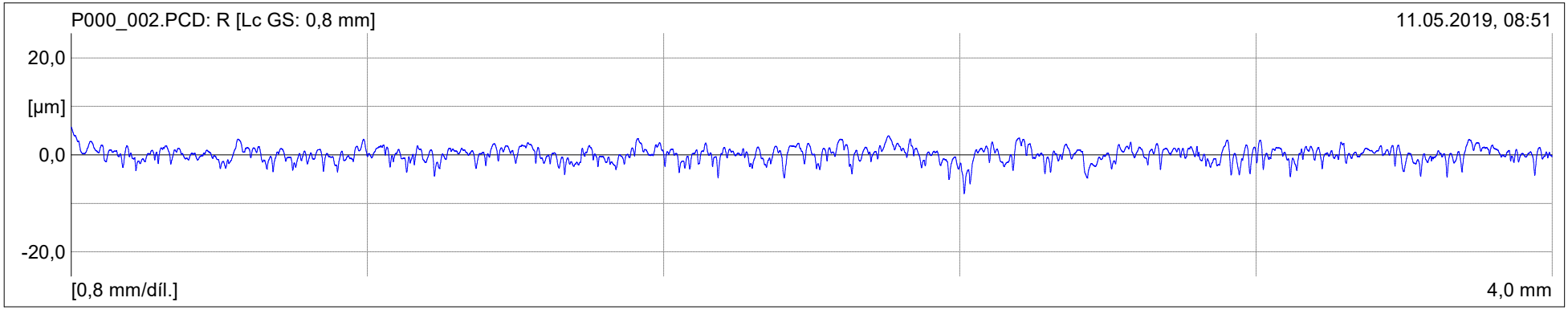


Ra	1,196	µm	Rq	1,569	µm	Rz	8,51	µm
RzJ	4,71	µm	Rmax	11,00	µm	Rp	3,32	µm
Rpm	3,78	µm	Rpk	1,12	µm	Rk	3,56	µm
Rvk	2,76	µm	Mr1	8,87	%	Mr2	88,1	%
A1	49,56	µm2/mm	A2	164,6	µm2/mm	Vo	0,016	mm3/µm2
Rt	11,40	µm	R3z	6,79	µm	RSm	63	µm
Rsk	-0,743		S	25	µm	R	5,11	µm
Ar	72	µm	Rx	12,7	µm			

Mahr	**SVÚM a.s.** Oddělení polymerů a technologie fluoroplastů Tovární 2053 Čelákovice	**PS1** Explorer [v1.20-07]

Objekt:	Anodická oxidace - PEO 2
Číslo:	08
Komentář:	90°

Lt:	5,60 mm
Ls:	2,5 µm
VB:	350 µm
Vt:	0,50 mm/s
Body:	11200
Snímač:	PHT 350



Ra	1,172	µm	Rq	1,503	µm	Rz	9,03	µm
RzJ	4,69	µm	Rmax	11,40	µm	Rp	3,91	µm
Rpm	5,69	µm	Rpk	1,30	µm	Rk	3,56	µm
Rvk	1,93	µm	Mr1	7,63	%	Mr2	86,1	%
A1	49,67	µm2/mm	A2	134,2	µm2/mm	Vo	0,013	mm3/µm2
Rt	13,70	µm	R3z	7,01	µm	RSm	73	µm
Rsk	-0,384		S	26	µm	R	6,28	µm
Ar	128	µm	Rx	13,6	µm			

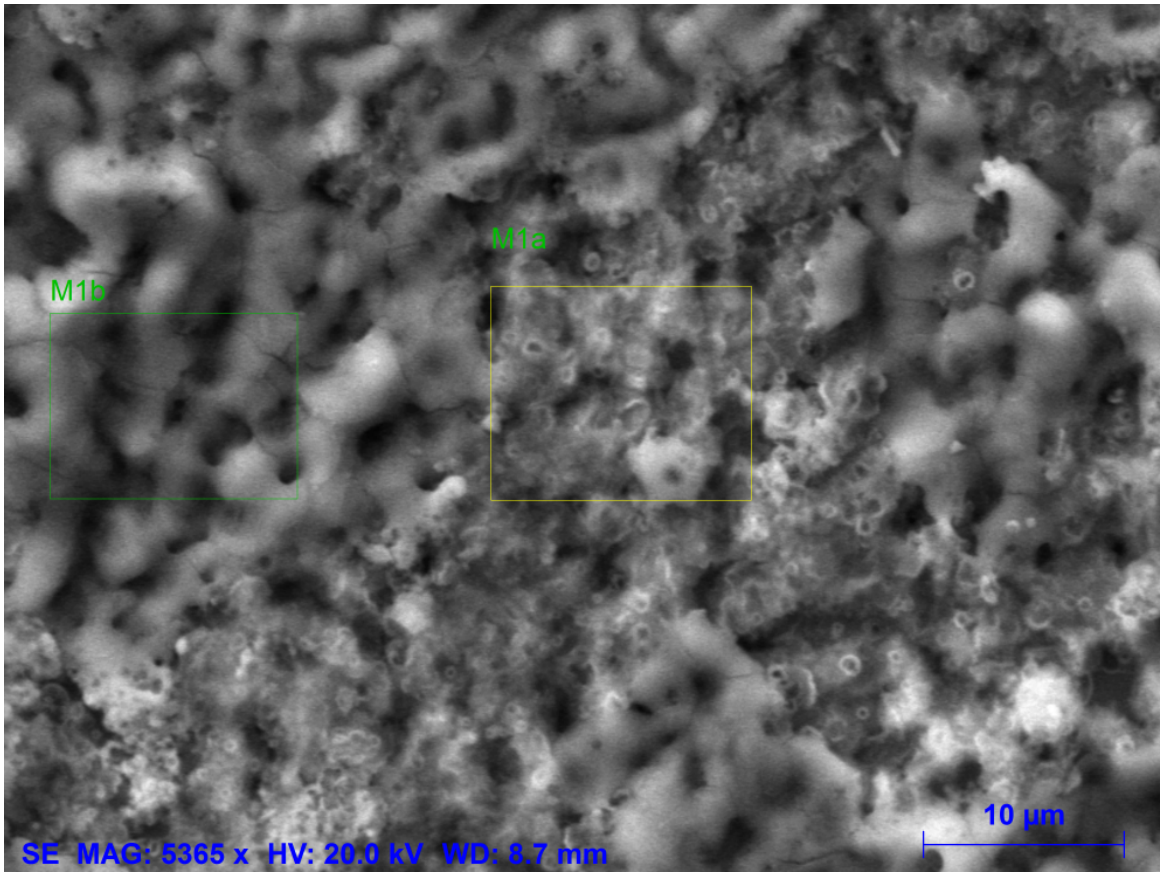
Příloha č.4

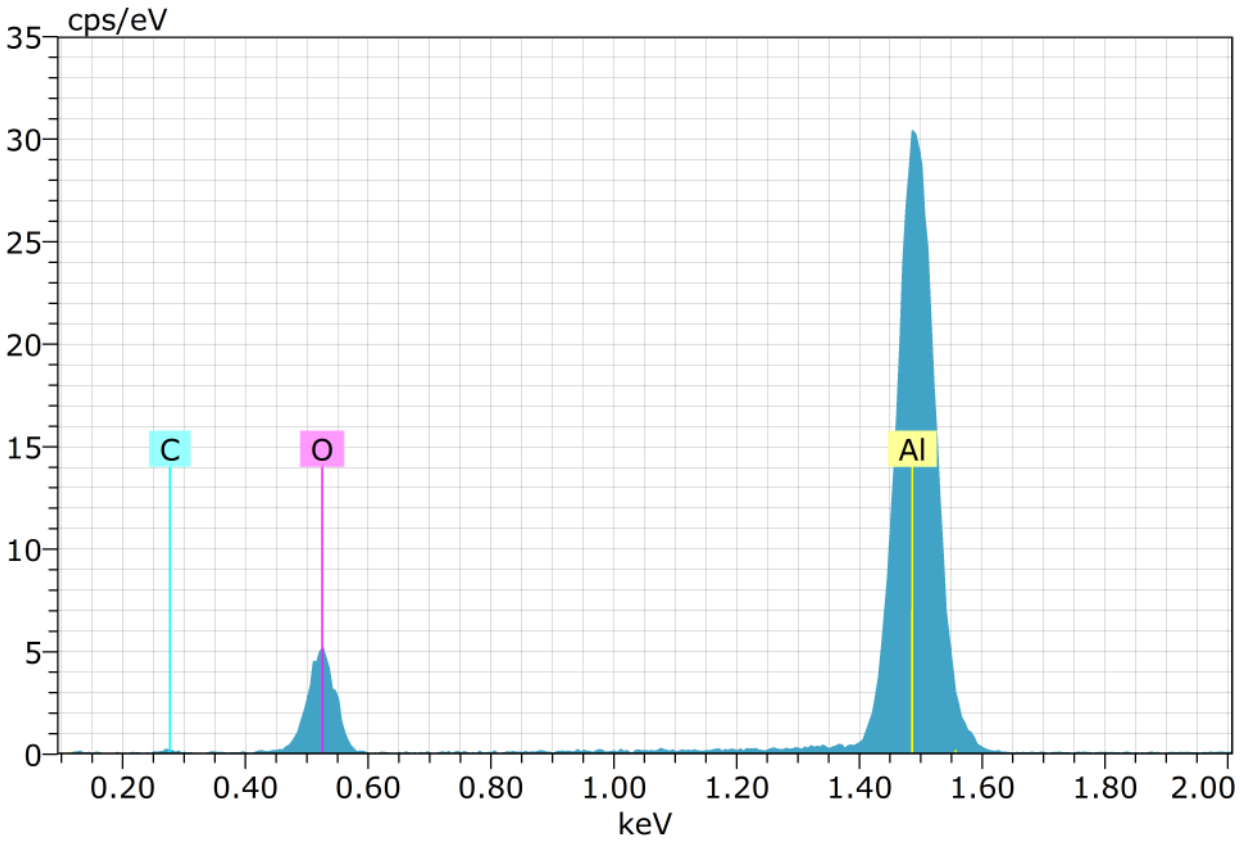
SEM XRD Analýza

Vrstev plasmové elektrolytické oxidace

SVUM / PEO SEM

3.4. 2019



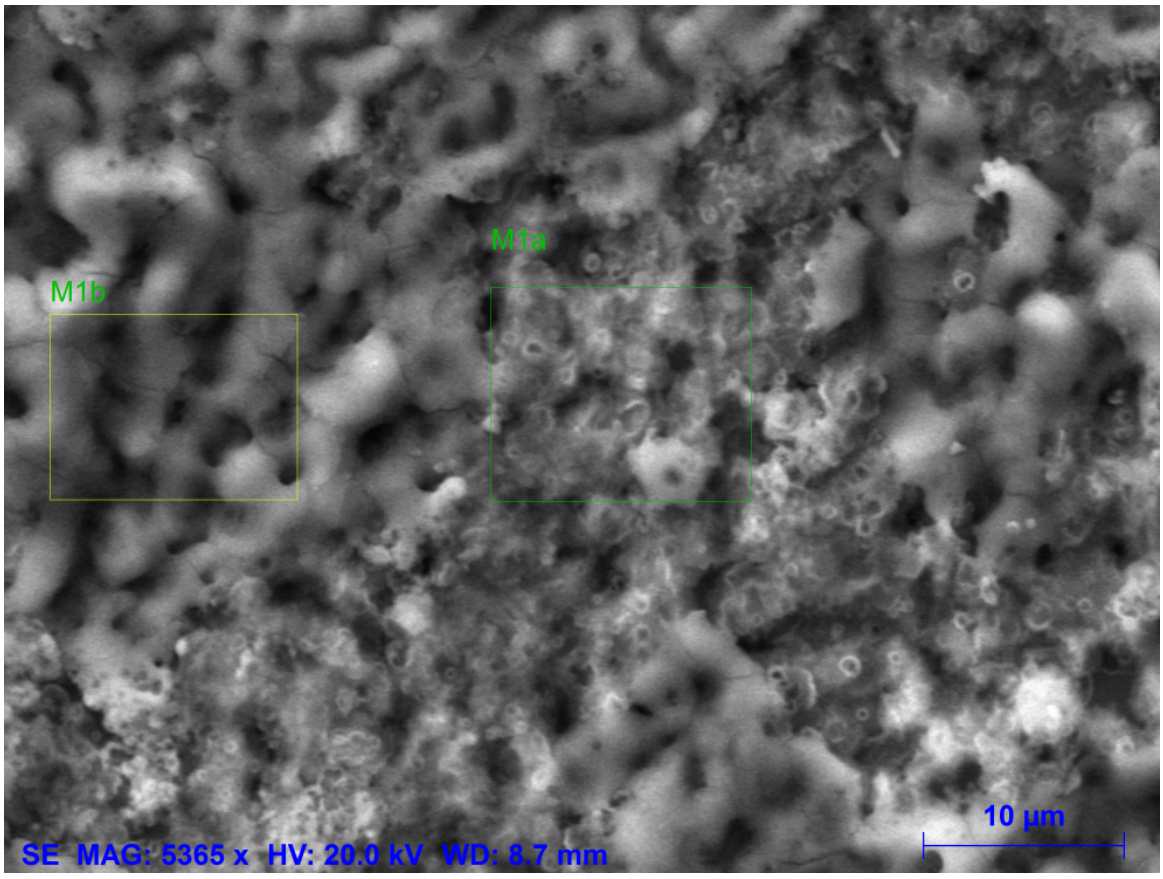


C

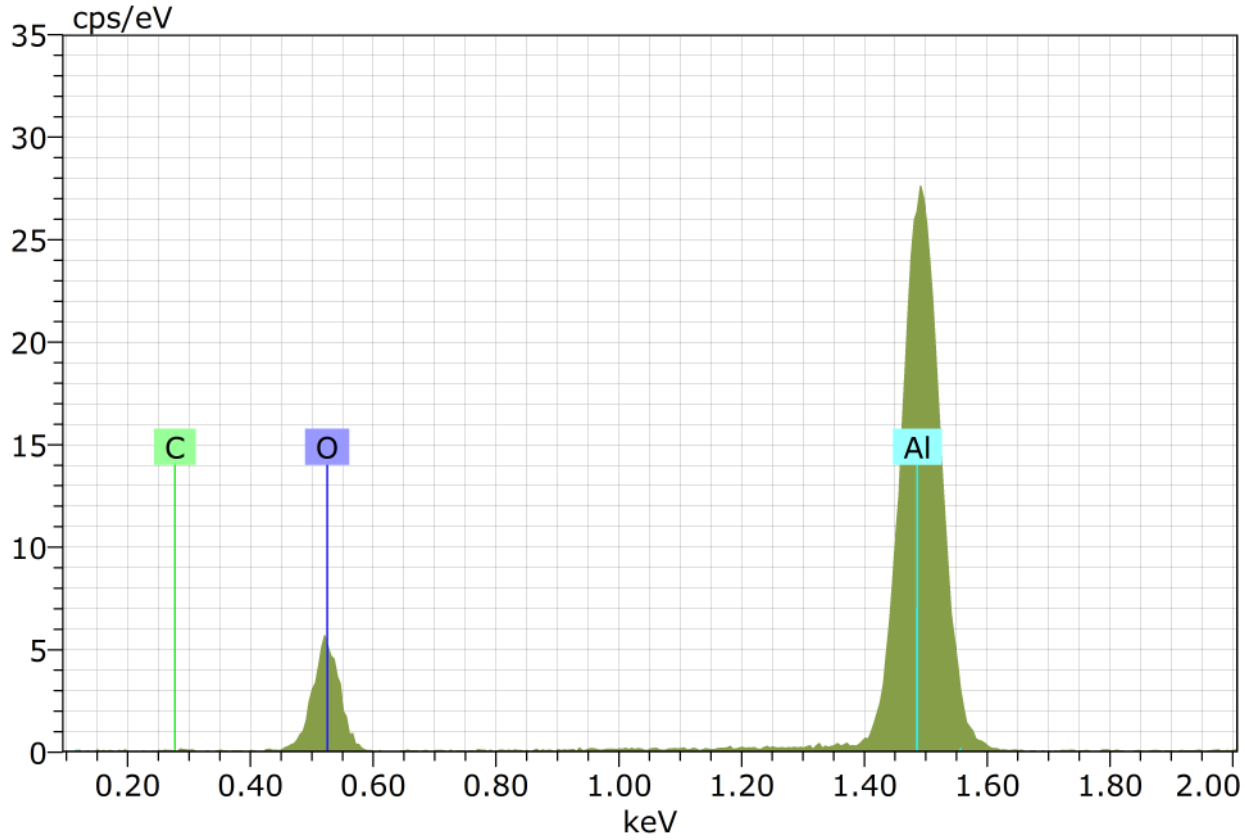
F

Spectrum: M1a

El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
C	6	K-series	4.94	4.92	8.45	2.33
O	8	K-series	36.13	36.01	46.41	5.88
Al	13	K-series	59.26	59.07	45.14	2.89
		Total:	100.33	100.00	100.00	



F



Spectrum: M1b

El	AN	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error (1 Sigma) [wt.%]
C	6	K-series	3.26	3.05	5.26	1.86
O	8	K-series	41.12	38.54	49.89	6.54
Al	13	K-series	62.33	58.41	44.84	3.04
		Total:	106.70	100.00	100.00	

Příloha č.5

Analýza PEO vrstev na součástech rotorových dopřádacích strojů - RIETER

Report R&D Technology

Rotors surface coating PEO

Report No.:	18_18
Date:	03.05.2018
Project leader:	Štorek/Dalecký
Originated by:	Kubeš V.

To: Boněk K.

Chvojka M.

cc:

Filing:

Table of contents

1. Present situation

1.1. Situation

The rotors surface coating PEO shows positive performance as serial existing part. Base on positive results from shorter tests extend test with rotors mark PEO 5, PEO 9 and PEO 11.

1.2. Task

To compare rotors standardly used and delivered rotors with surface coating PEO:

- **C533/U PEO 5**
- **C533/U PEO 9**
- **C533/U PEO 11**

1.3. Objective

Verification of applicability delivered rotors surface coating PEO.

2. Conclusion

Rotors surface coating PEO reach worse value in quality yarn – CV% and total IPI.

Strength of yarn is comparable with standard used rotors only for material Viscose.

Trash and dust particles accumulation in rotor groove is smaller at rotors surface coating PEO.

3. Trial set up

3.1. Raw material

Tab.1 Sliver

Position	RA25 –RA32	RA33 – RA36	RA41- RA48
Raw material	Cotton	Cotton	Viscose
Blend	100%	100%	100% Lenzing
Origin	C10	Actual Spinning A3	CV Filogroup
Sliver count [tex]	6000	5600	5000
Classing staple [mm]			38
Fibre fineness [dtex]			1,3

Tab.2 Cotton

Uster Afis		*Trash Tester*	
L (w)	25,2 mm	Trash	0,06 %
L (n)	21,6 mm	Dust	0,02 %
UQL (w)	30,5mm	Short Fiber	0,03 %
SFC (n) 12,7	17,1%		
Neps	118/g		

Tab.3 Cotton

Uster Afis		*Trash Tester*	
L (w)	24,2 mm	Trash	0,70 %
L (n)	19,7 mm	Dust	0,03 %
UQL (w)	30,0mm	Short Fiber	0,07 %
SFC (n) 12,7	24,6%		
Neps	253/g		

3.2. Process set up

Tab.4 Process

Pos.	**Feed weight** [tex]	**Delivery weight** [Ne]	**Twist** [m^{-1}]	**Rotor speed** [rpm]	**Comments**
RA25-28	6000	20	840	100000	C10
RA29-32	6000	12	590	90000	C10
RA33-36	5600	20	787	100000	A3
RA37-40	5600	30	1080	100000	A3
RA41-44	5000	30	860	100000	CV
RA45-48	5000	20	690	100000	CV

3.3. Machine specifications

Tab.5 Cotton – C10

Rotor type	C533/U D C533/U PEO	
Yarn [Ne]	20	12
RPM [min^{-1}]	100000	90000
Opening roller type	C40 DN G	C40 DN G
Op. roller speed [min^{-1}]	9000	9500
Nozzle	SR7RS	SR7RS
Delivery segment	U-segment	U-segment

Tab.6 Cotton - Actual Spinning

Rotor type	C533/U D C533/U PEO	
Yarn [Ne]	30	20
RPM [min^{-1}]	100000	100000
Opening roller type	C40 DN G	C40 DN G
Op. roller speed [min^{-1}]	9000	9000
Nozzle	CR7RS	CR7RS
Delivery segment	U-segment	U-segment

Tab.7 Viscose

Rotor type	C533/U D C533/U PEO	
Yarn [Ne]	30	20
RPM [min^{-1}]	100000	100000
Opening roller type	C61 DN G	C61 DN G
Op. roller speed [min^{-1}]	9000	9000
Nozzle	CR7RS	CR7RS
Delivery segment	U-segment	U-segment

4. Test results

Tab.8: C10 – Ne20

Datum: 29.3.2018	RA28	RA25	RA26	RA27
Setting				
Machine	R35			
Material	C10			
Sliver [tex]	6 000			
Yarn [tex]	**29,5**			
Draft	203,4			
Alpha tex	80			
Twist [T/m]	840			
Rotor	C533/U-D standard	C533/U-D PEO 11	C533/U-D PEO 9	C533/U-D PEO 5
Rotor RPM [1/min]	100 000			
Opening roll.	C40D-PP-G			
Opening roll RPM [1/min]	9 000			
Nozzle	CR7RS			
Twist Stop	U segment			
Bobbins length [m]	5 000	5 000	5 000	5 000
Number of spinning unit	15	5	5	5
Results	**RA28**	**RA25**	**RA26**	**RA27**
Yarn count (tex)	30,1	30,1	30,0	30,3
Strength TR/TJ [cN/tex]	**12,1 / 14,1**	**11,5 / 13,7**	**11,7 / 13,8**	**11,9 / 13,9**
CV% Strength TR / TJ	8,94 / 9,84	9,82 / 9,56	10,62 / 10,13	13,54 / 10,57
Elongation TR / TJ [%]	5,91 / 5,33	5,58 / 5,38	5,64 / 5,28	5,83 / 5,42
USTER CV%	**13,0**	**13,5**	**13,3**	**13,4**
CVb	2,0	1,6	1,5	1,6
Thin (-30%)	1414	1803	1707	1613
Thin (-40%)	83	130	107	99
Thin (-50%)	**1**	**3**	**2**	**1**
Thick (+35%)	357	434	415	401
Thick (+50%)	**46**	**51**	**55**	**54**
Neps (+140%)	2068	2923	2690	2478
Neps (+200%)	384	513	477	423
Neps (+280%)	**84**	**108**	**104**	**87**
Total IPI (-50%,+50%+280%)	**131**	**162**	**160**	**142**
Sensitive IPI (-30%,+35%+200%)	**2155**	**2750**	**2599**	**2436**
Uster Haarigkeit	3,77	3,87	3,83	3,96
Trash count [km]	29,0	28,0	29,4	29,4
Dust count [km]	2454	2460	2412	2362
Zweigle HL400 S3/m	1,9	1,6	2,1	2,2
Zweigle HL400 N1+N2/m	32,8	39,3	36,9	34,8

Tab.9: C10 – Ne12

Datum: 29.3.2018	**RA29**	**RA32**	**RA31**	**RA30**
Setting				
Machine	**R35**			
Material	**C10**			
Sliver [tex]	**6 000**			
Yarn [tex]	**50**			
Draft	120,0			
Alpha tex	80			
Twist [T/m]	590			
Rotor	**C533/U-D standard**	**C533/U-D PEO 11**	**C533/U-D PEO 9**	**C533/U-D PEO 5**
Rotor RPM [1/min]	90 000			
Opening roll.	C40D-PP-G			
Opening roll RPM [1/min]	9 500			
Nozzle	CR7RS			
Twist Stop	U segment			
Bobbins length [m]	5 000	5 000	5 000	5 000
Number of spinning unit	5	5	5	5
Results	**RA29**	**RA32**	**RA31**	**RA30**
Yarn count (tex)	50,7	50,7	51,0	50,3
Strength TR/TJ [cN/tex]	**13,0 /15,1**	**12,7 / 14,8**	**12,5 / 14,9**	**12,6 /14,7**
CV% Strength TR / TJ	9,66 / 8,66	7,6 / 7,7	8,05 / 8,9	7,79 / 8,24
Elongation TR / TJ [%]	6,72 / 6,16	6,48 / 6,03	6,56 / 6,11	6,52 / 5,97
USTER CV%	**11,6**	**11,9**	**11,8**	**11,8**
CVb	0,7	1,5	1,0	1,4
Thin (-30%)	553	705	662	674
Thin (-40%)	14	21	16	17
Thin (-50%)	**0**	**0**	**0**	**0**
Thick (+35%)	174	203	201	196
Thick (+50%)	**15**	**20**	**17**	**17**
Neps (+140%)	901	1231	1172	1272
Neps (+200%)	135	171	170	176
Neps (+280%)	**25**	**28**	**25**	**29**
Total IPI (-50%,+50%+280%)	**40**	**49**	**42**	**46**
Sensitive IPI (-30%,+35%+200%)	**862**	**1079**	**1034**	**1046**
Uster Haarigkeit	3,98	4,05	3,98	4,14
Trash count [km]	54,6	48,0	49,0	49,2
Dust count [km]	3500	3640	3517	3486
Zweigle HL400 S3/m	2,0	2,1	2,0	1,9
Zweigle HL400 N1+N2/m	34,2	35,9	37,1	36,7

Tab.10: Actual - Ne30

Datum: 9.4.2018	RA37	RA38	RA39	RA40
Setting				
Machine	R35			
Material	Actual A3			
Sliver [tex]	5 600			
Yarn [tex]	20			
Draft	280,0			
Alpha tex	80			
Twist [T/m]	1080			
Rotor	C533/U-D standard	C533/U-D PEO 11	C533/U-D PEO 9	C533/U-D PEO 5
Rotor RPM [1/min]	100 000			
Opening roll.	C40D-PP-G			
Opening roll RPM [1/min]	9 000			
Nozzle	CR7RS			
Twist Stop	U segment			
Bobbins length [m]	5 000	5 000	5 000	5 000
Number of spinning unit	5	5	5	5
Results	**RA37**	**RA38**	**RA39**	**RA40**
Yarn count (tex)	19,7	19,8	19,8	19,8
Strength TR/TJ [cN/tex]	**11,5 / 13,3**	**10,7 / 12,6**	**11 / 12,7**	**10,8 / 12,7**
CV% Strength TR / TJ	7,6 / 9,27	8,64 / 10,03	8,37 / 9,14	8,44 / 9,87
Elongation TR / TJ [%]	5,37 / 4,93	5,1 / 4,75	5,24 / 4,8	5,21 / 4,79
USTER CV%	**14,7**	**15,5**	**15,4**	**15,3**
CVb	2,1	0,9	1,0	1,0
Thin (-30%)	3546	4589	4386	4304
Thin (-40%)	471	729	705	666
Thin (-50%)	**25**	**53**	**46**	**41**
Thick (+35%)	674	880	838	807
Thick (+50%)	**64**	**88**	**86**	**79**
Neps (+140%)	4495	6811	6301	5891
Neps (+200%)	671	1233	1090	957
Neps (+280%)	**75**	**128**	**110**	**90**
Total IPI (-50%,+50%+280%)	**164**	**270**	**242**	**210**
Sensitive IPI (-30%,+35%+200%)	**4891**	**6702**	**6314**	**6068**
Uster Haarigkeit	3,32	3,59	3,58	3,58
Trash count [km]	3,6	2,4	1,0	3,2
Dust count [km]	806	793	749	795
Zweigle HL400 S3/m	1,8	2,2	2,0	2,4
Zweigle HL400 N1+N2/m	32,5	39,2	36,3	35,4

Tab.11: Actual – Ne20

Datum: 9.4.2018	**RA36**	**RA33**	**RA34**	**RA35**
Setting				
Machine	**R35**			
Material	**Actual A3**			
Sliver [tex]	**5 600**			
Yarn [tex]	**29,5**			
Draft	189,8			
Alpha tex	75			
Twist [T/m]	787			
Rotor	**C533/U-D standard**	**C533/U-D PEO 11**	**C533/U-D PEO 9**	**C533/U-D PEO 5**
Rotor RPM [1/min]	100 000			
Opening roll.	C40D-PP-G			
Opening roll RPM [1/min]	9 000			
Nozzle	CR7RS			
Twist Stop	U segment			
Bobbins length [m]	5 000	5 000	5 000	5 000
Number of spinning unit	5	5	5	5
Results	**RA36**	**RA33**	**RA34**	**RA35**
Yarn count (tex)	29,6	29,3	29,3	29,3
Strength TR/TJ [cN/tex]	**12,1 / 14,5**	**11,9 / 14,1**	**12,1 / 14,2**	**11,9 / 14,2**
CV% Strength TR / TJ	6,98 / 6,7,41	6,51 / 8,01	7,2 / 7,91	6,98 / 7,,89
Elongation TR / TJ [%]	5,86 / 5,62	5,86 / 5,38	6,02 / 5,52	5,82 / 5,49
USTER CV%	**12,2**	**12,7**	**12,5**	**12,5**
CVb	1,1	1,0	1,4	1,0
Thin (-30%)	1232	1682	1541	1543
Thin (-40%)	74	123	105	105
Thin (-50%)	**1**	**2**	**2**	**2**
Thick (+35%)	189	267	243	241
Thick (+50%)	**7**	**13**	**11**	**11**
Neps (+140%)	770	1458	1313	1199
Neps (+200%)	63	108	91	92
Neps (+280%)	**6**	**8**	**9**	**9**
Total IPI (-50%,+50%+280%)	**13**	**24**	**21**	**23**
Sensitive IPI (-30%,+35%+200%)	**1484**	**2057**	**1875**	**1877**
Uster Haarigkeit	3,55	3,84	3,76	3,71
Trash count [km]	3,6	4,8	3,4	3,8
Dust count [km]	1062	1116	1048	1121
Zweigle HL400 S3/m	1,4	2,0	1,9	1,9
Zweigle HL400 N1+N2/m	30,1	37,1	34,1	34,0

Tab.12: Viscose – Ne30

Datum: 16.4.2018	RA44	RA43	RA42	RA41
Setting				
Machine	R35			
Material	Viscose F3			
Sliver [tex]	5 000			
Yarn [tex]	20			
Draft	250,0			
Alpha tex	63			
Twist [T/m]	860			
Rotor	C533/U-D standard	C533/U-D PEO 11	C533/U-D PEO 9	C533/U-D PEO 5
Rotor RPM [1/min]	100 000			
Opening roll.	C61D-PP-G			
Opening roll RPM [1/min]	9 000			
Nozzle	CR7RS			
Twist Stop	U segment			
Bobbins length [m]	5 000	5 000	5 000	5 000
Number of spinning unit	5	5	5	5
Results	**RA44**	**RA43**	**RA42**	**RA41**
Yarn count (tex)	20,9	21,2	21,0	20,9
Strength TR/TJ [cN/tex]	**12,4 / 15,6**	**12,3 / 15,4**	**12,4 / 15,4**	**12,4 / 15,5**
CV% Strength TR / TJ	8,9 / 9,41	9,2 / 9,9	8,7 / 9,3	8,3 / 9,5
Elongation TR / TJ [%]	11,2 / 12,4	11,4 / 12,5	11,4 / 12,5	11,2 / 12,5
USTER CV%	**14,2**	**14,8**	**14,7**	**14,7**
CVb	1,7	2,5	0,9	0,8
Thin (-30%)	2264	2821	2766	2729
Thin (-40%)	247	348	334	309
Thin (-50%)	**11**	**17**	**15**	**12**
Thick (+35%)	481	593	582	594
Thick (+50%)	**60**	**73**	**76**	**81**
Neps (+140%)	1367	2084	2063	2006
Neps (+200%)	128	212	211	199
Neps (+280%)	**22**	**34**	**37**	**39**
Total IPI (-50%,+50%+280%)	**93**	**124**	**128**	**132**
Sensitive IPI (-30%,+35%+200%)	**2873**	**3626**	**3559**	**3522**
Uster Haarigkeit	3,55	3,71	3,69	3,67
Trash count [km]				
Dust count [km]				
Zweigle HL400 S3/m	3,6	3,6	3,9	3,0
Zweigle HL400 N1+N2/m	47,7	56,7	58,0	55,5

Tab.13: Viscose – Ne20

Datum: 16.4.2018	RA45	RA48	RA47	RA46
Setting				
Machine	R35			
Material	Viscose F3			
Sliver [tex]	5 000			
Yarn [tex]	**29,5**			
Draft	169,5			
Alpha tex	66			
Twist [T/m]	690			
Rotor	C533/U-D standard	C533/U-D PEO 11	C533/U-D PEO 9	C533/U-D PEO 5
Rotor RPM [1/min]	100 000			
Opening roll.	C61D-PP-G			
Opening roll RPM [1/min]	9 000			
Nozzle	CR7RS			
Twist Stop	U segment			
Bobbins length [m]	5 000	5 000	5 000	5 000
Number of spinning unit	5	5	5	5
Results	**RA45**	**RA48**	**RA47**	**RA46**
Yarn count (tex)	30,9	30,9	31,0	31,0
Strength TR/TJ [cN/tex]	**12,8 / 16,4**	**13,0 / 16,6**	**13,0 / 16,5**	**13,0 / 16,5**
CV% Strength TR / TJ	6,5 / 7,8	7,2 / 8,1	7,0 / 8,2	6,8 / 8,2
Elongation TR / TJ [%]	11,2 / 12,6	11,8 / 13,4	11,6 / 13,2	11,6 / 13,1
USTER CV%	**12,5**	**12,9**	**12,8**	**12,8**
CVb	1,4	1,2	1,1	1,2
Thin (-30%)	1048	1272	1233	1199
Thin (-40%)	54	84	75	77
Thin (-50%)	**0**	**3**	**3**	**1**
Thick (+35%)	240	297	296	276
Thick (+50%)	**26**	**33**	**31**	**34**
Neps (+140%)	360	549	457	458
Neps (+200%)	36	55	50	52
Neps (+280%)	**10**	**14**	**13**	**14**
Total IPI (-50%,+50%+280%)	**37**	**50**	**47**	**50**
Sensitive IPI (-30%,+35%+200%)	**1324**	**1624**	**1579**	**1527**
Uster Haarigkeit	3,96	4,12	4,01	4,12
Trash count [km]				
Dust count [km]				
Zweigle HL400 S3/m	3,6	4,2	4,3	3,9
Zweigle HL400 N1+N2/m	65,6	68,2	73,3	69,6

Tab.14: Trash in rotor groove – Ne20

Datum: 24.4.2018		**100% ba C11 - 1,05% trash / trash 0,84, dust 0,06, short fibers 0,15/**		
Setting				
Machine		**R35**		
Material		**C11**		
Sliver	**[tex]**	**6 000**		
Yarn	**[tex]**	**29,5**		
Draft		203,4		
Alpha tex		80		
Twist	**[T/m]**	840		
Rotor		**C533/U-D standard**	**C533/U-D PEO 5**	**C533/U-D PEO 9**
Rotor RPM	**[1/min]**	100 000		
Delivery speed	**[m/ min]**	119,0		
Opening roll.		C40D-PP-G		
Opening roll RPM	**[1/min]**	9 500		
Nozzle		CR7RS		
Twist Stop		U segment		
Bobbins length	**[m]**	40 000		
Tets period	**(h)**	5,6		
Number of spinning unit		5	5	5
Results				
Yarn count	**(tex)**	30,1	30,1	30,1
T&DPA in rotor	**[mg/h/SR] ***	**2,47**	**1,10**	**1,41**

* trash and dust particles accumulation in rotor groove

5. Findings and recommendations

Results rotors surface coating PEO vs standardly used rotor C533/U D:

- **Yarn Strength**

  Cotton Actual – rotors PEO have **smaller** strength than rotor C533/U D

  Cotton / Cotton waste C10 - rotors PEO have **about a little smaller** strength than rotor C533/U D

  Viscose – strength is comparable

- **Yarn CV %**

  All tested material - rotors PEO have **about a little worse** Uster qualities CV% than rotor C533/UD

- **Yarn total IPI**

  All tested material - rotors PEO have **worse** results in total IPI than rotor C533/U D

- **Yarn Hairiness**

  All tested material - rotors PEO have **about a little worse** result in Zweigle hairiness N1+N2

- **Trash and dust particles accumulation in rotor groove**

Trash and dust particles accumulation in rotor groove **is smaller at rotors surface coating PEO**.