A NEW BIO IMS FOR SIMULTANEOUS DETECTION OF CWAs AND BIOMATERIALS

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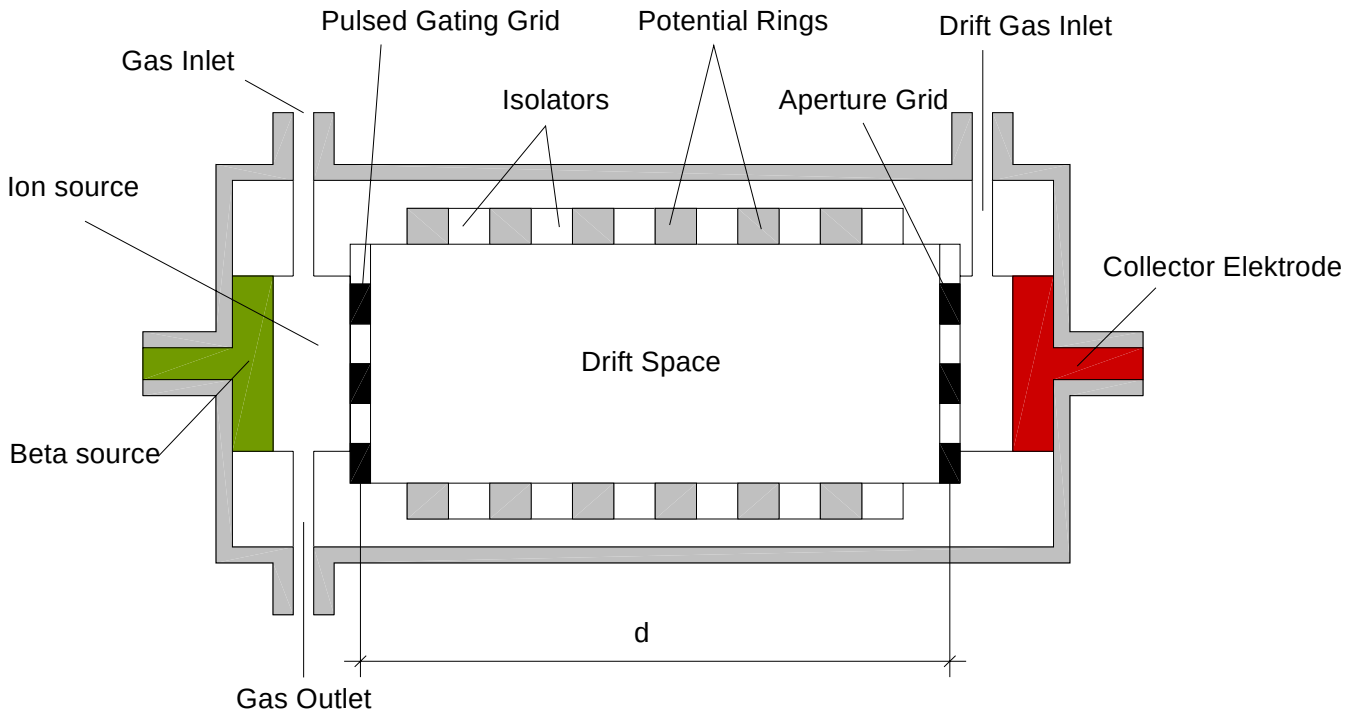
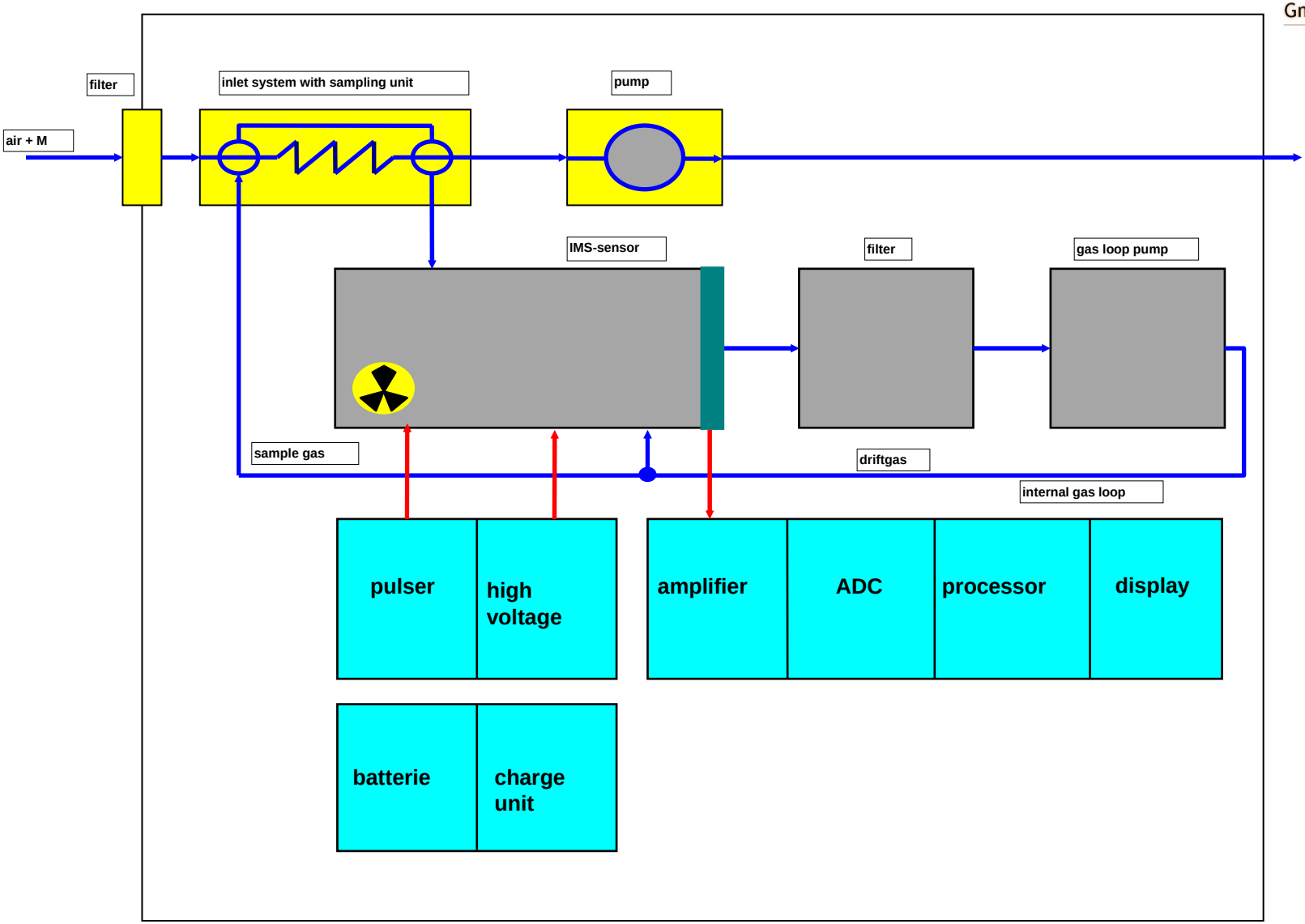
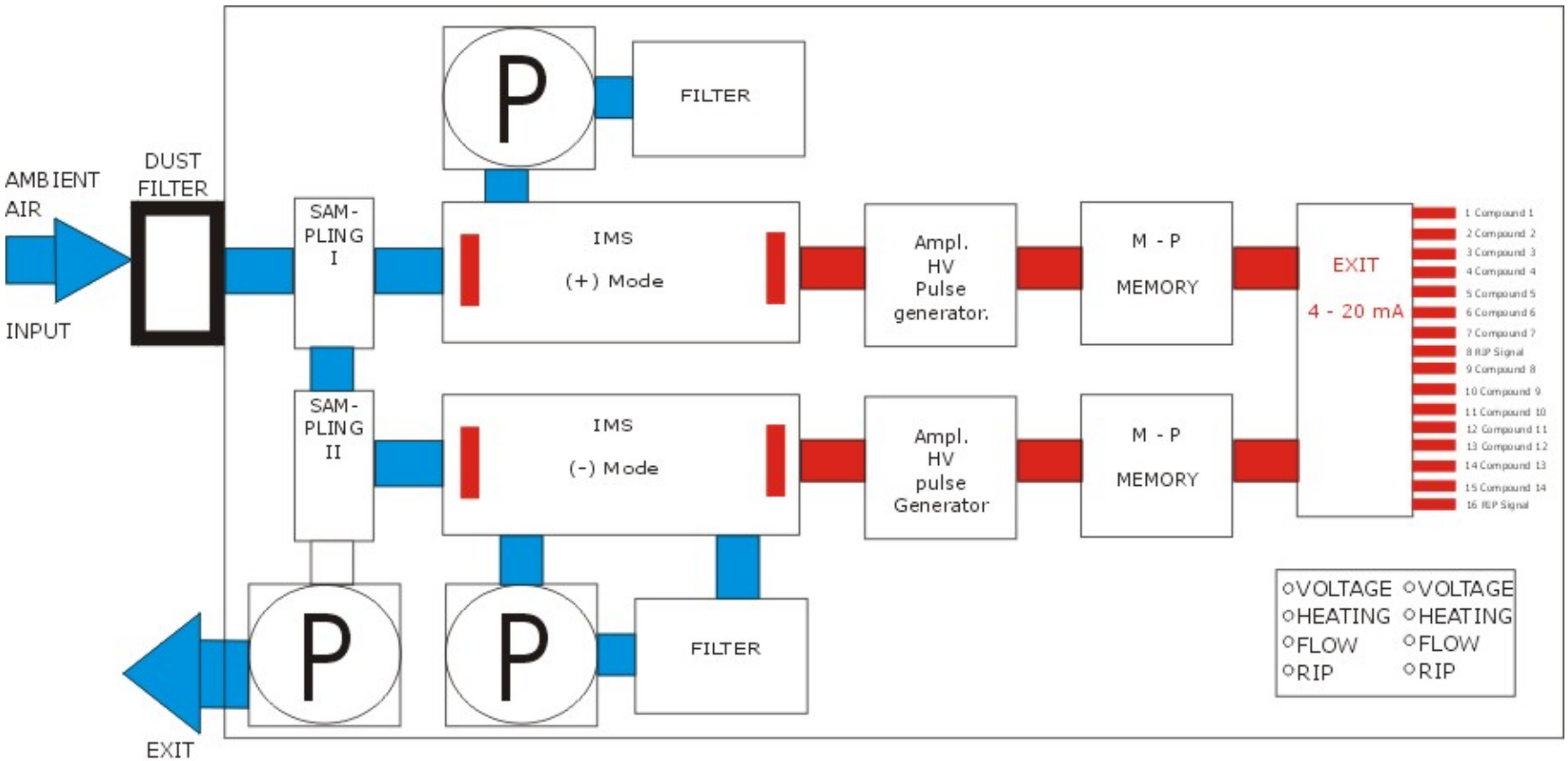
Isonics
corporation

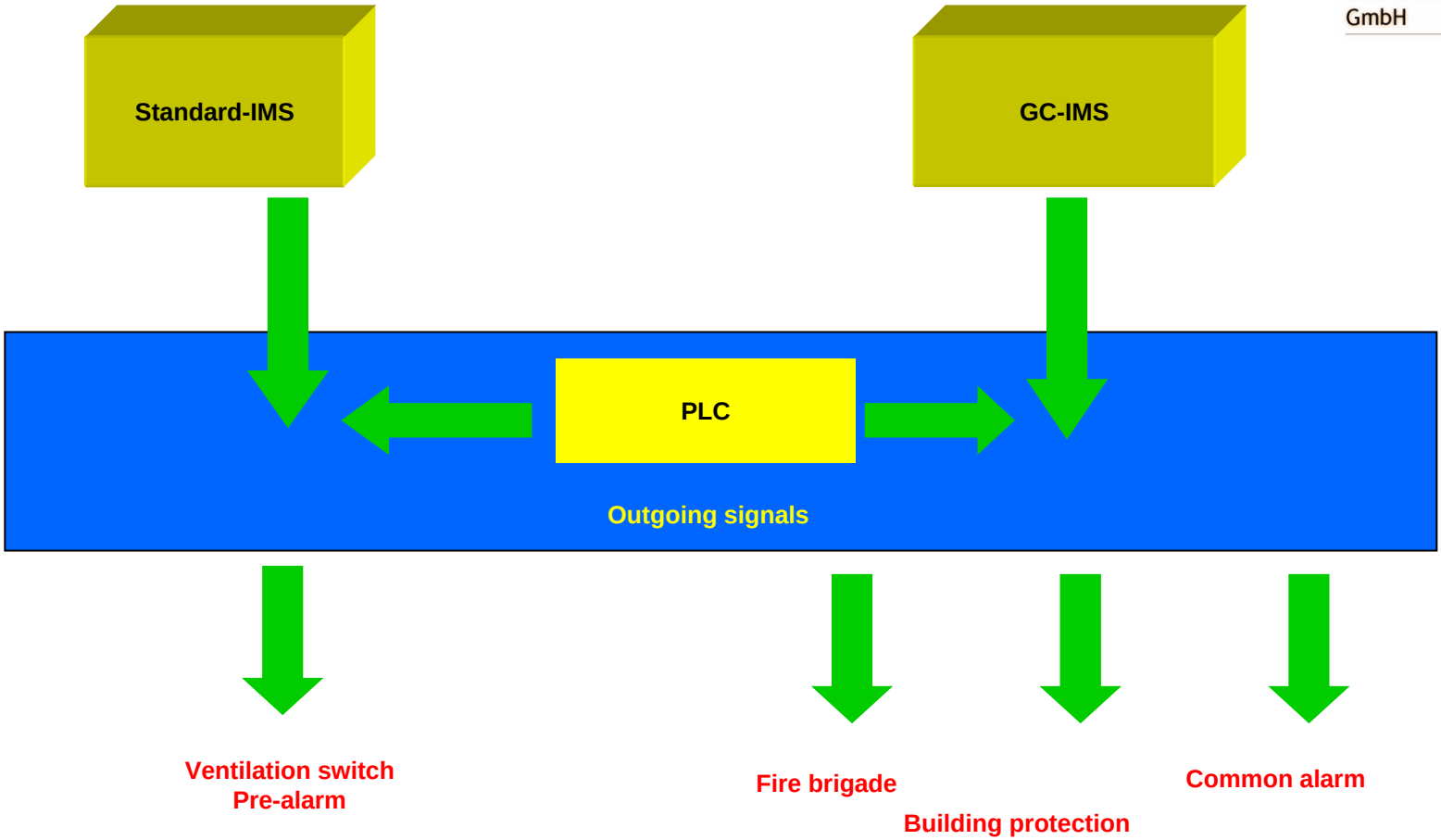

Pulsed Gating Grid
Potential Rings
Drift Gas Inlet
Gas Inlet
Isolators
Aperture Grid
Ion source
Collector Elektrode
Drift Space
Beta source
d
Gas Outlet

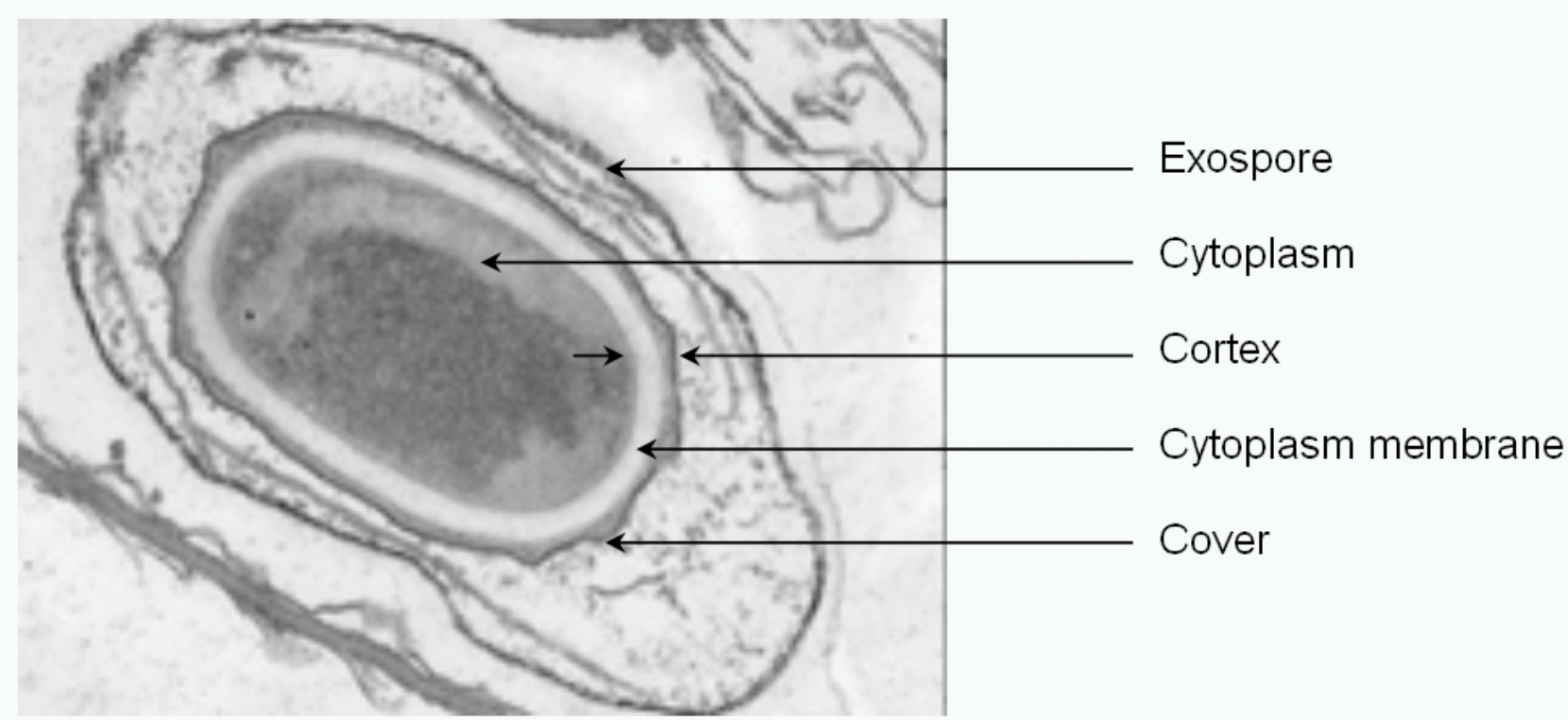

filter
inlet system with sampling unit
pump
air + M
IMS-sensor
filter
gas loop pump
sample gas
driftgas
internal gas loop
pulser
high voltage
amplifier
ADC
processor
display
batterie
charge unit

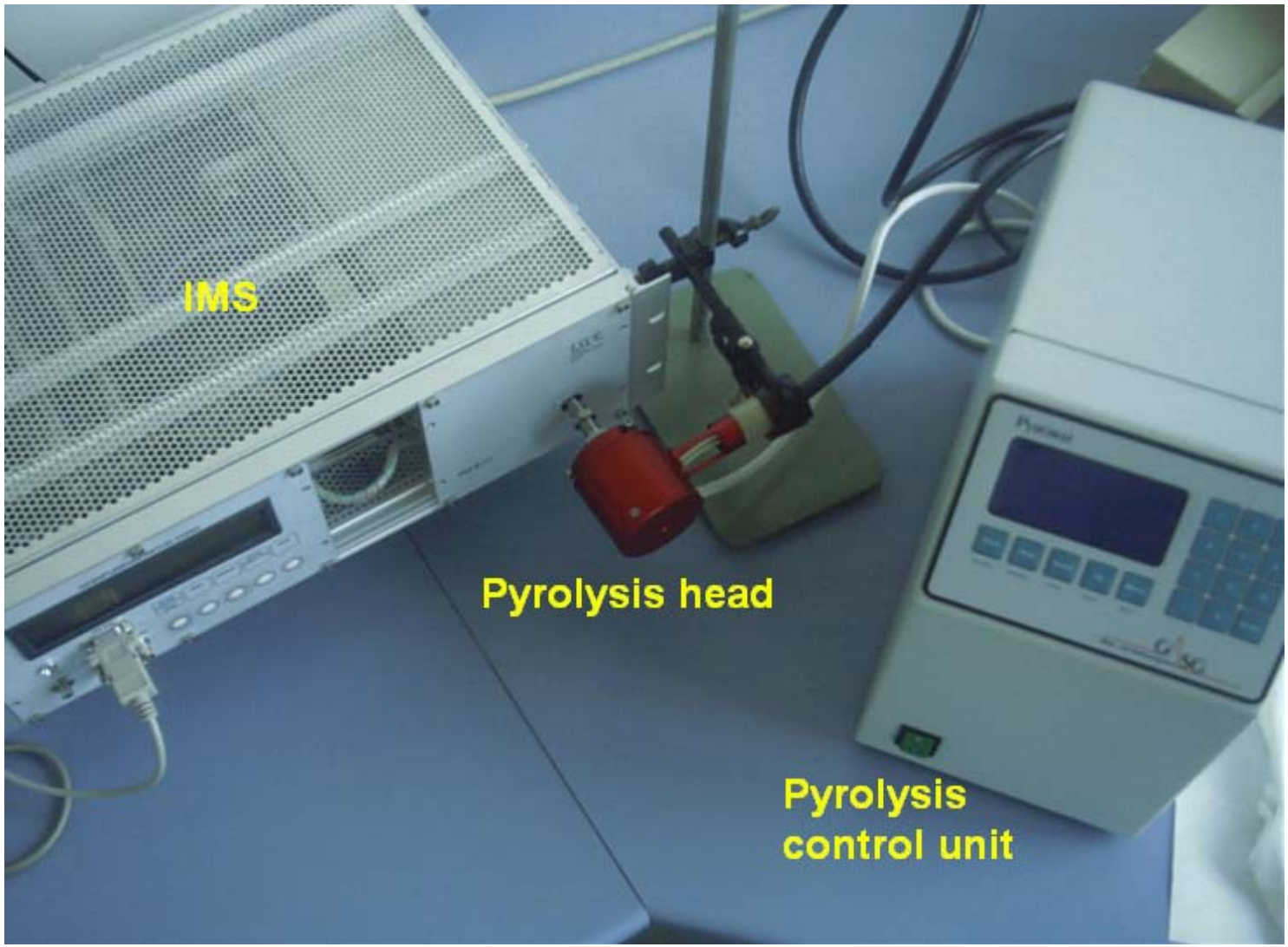
Chemical Warfare Agents	MDC (ppb)
Soman	1
Sarin	1
Tabun	1
S- Lost	10
N- Lost	10
Phosgene	3
HCN	15
Lewisit	5
VX	1

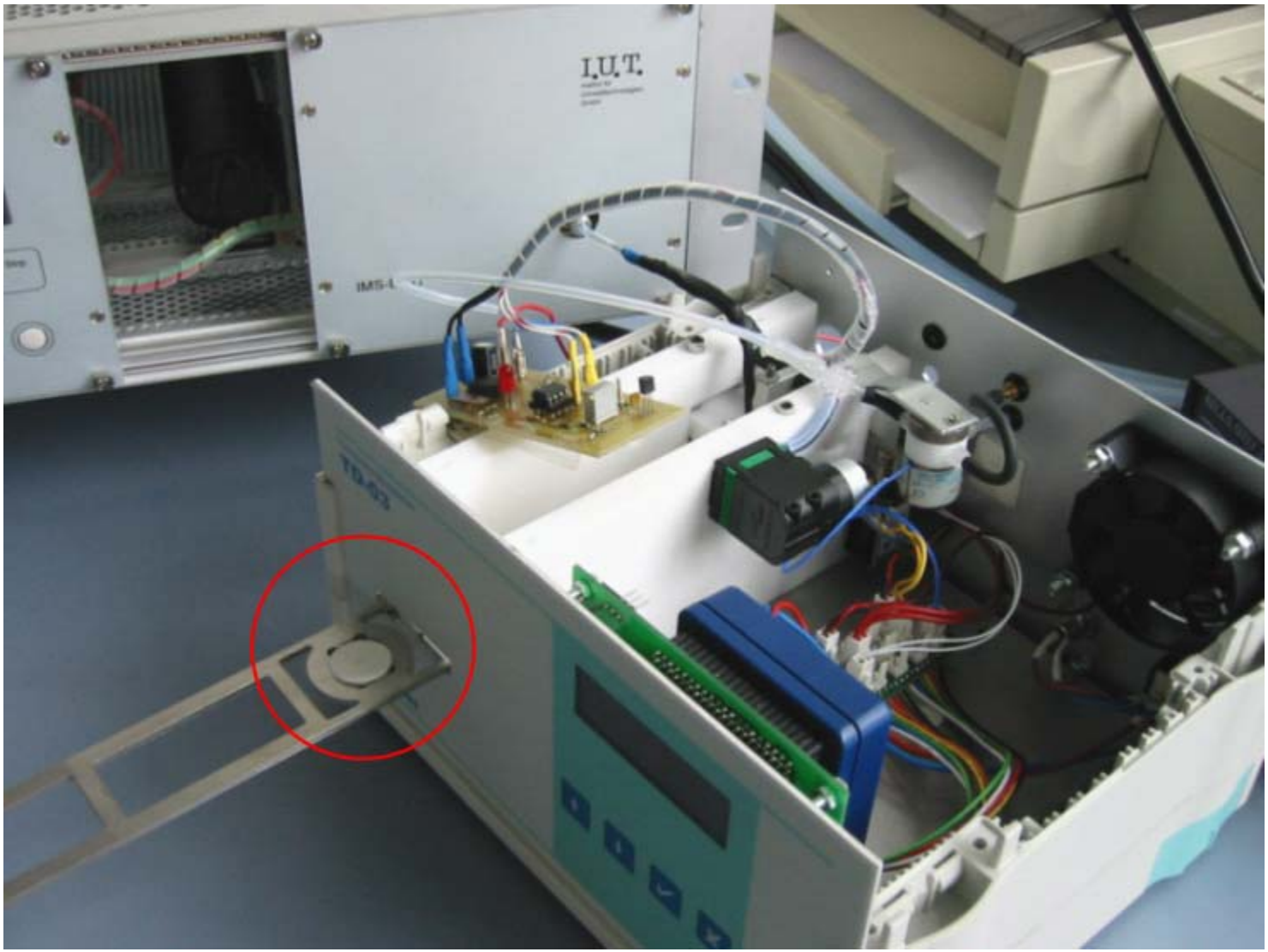
Toxic industrial compounds	MDC (ppb)
Acetone	1
Trichlorethylene	5
Cl2	10
Toluene	50
TDI	5
HF	5
HCl	5
Chlorcyan	5


AMBIENT AIR
INPUT
DUST FILTER
SAM-PLING I
SAM-PLING II
P
FILTER
IMS
(+) Mode
IMS
(-) Mode
Ampl. HV Pulse generator.
Ampl. HV pulse Generator
M - P MEMORY
M - P MEMORY
EXIT
4 - 20 mA
1 Compound 1
2 Compound 2
3 Compound 3
4 Compound 4
5 Compound 5
6 Compound 6
7 Compound 7
8 RIP Signal
9 Compound 8
10 Compound 9
11 Compound 10
12 Compound 11
13 Compound 12
14 Compound 13
15 Compound 14
16 RIP Signal
VOLTAGE
HEATING
FLOW
RIP
VOLTAGE
HEATING
FLOW
RIP
EXIT

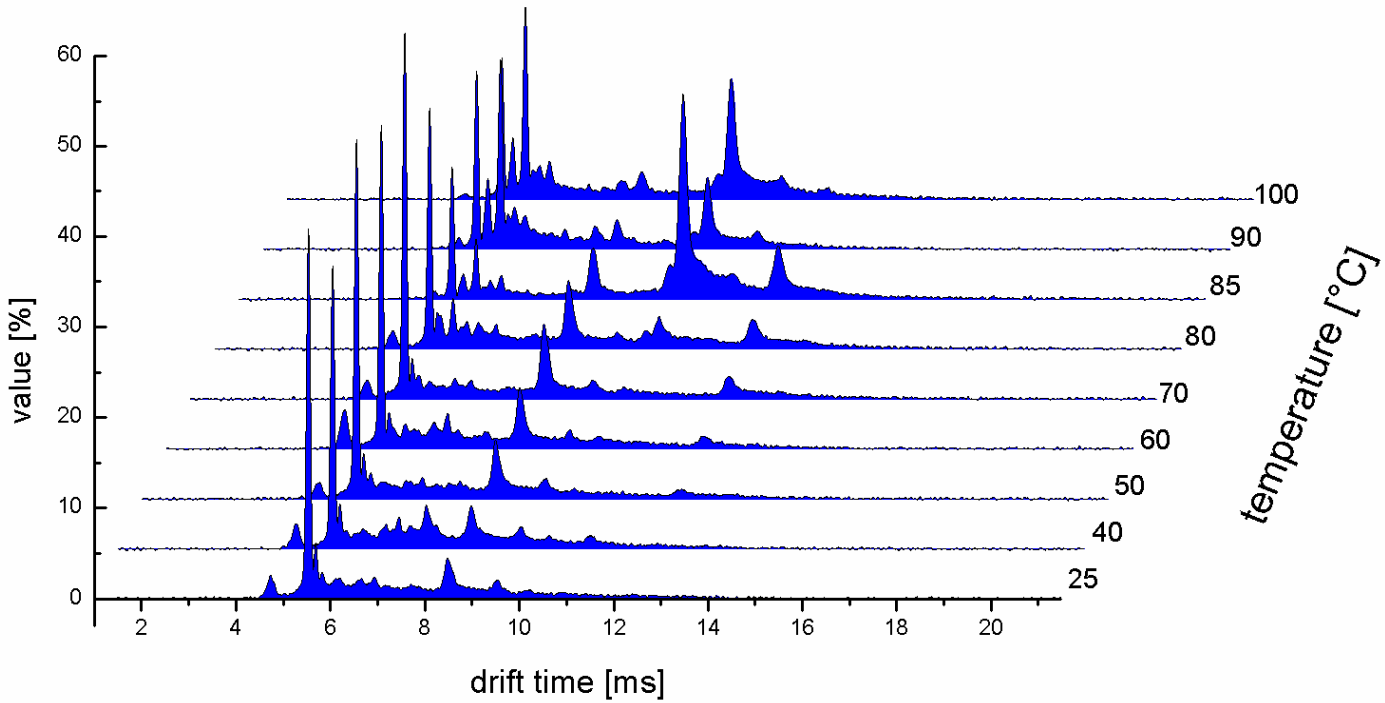

Standard-IMS
GC-IMS
PLC
Outgoing signals
Ventilation switch
Pre-alarm
Fire brigade
Building protection
Common alarm


Exospore
Cytoplasm
Cortex
Cytoplasm membrane
Cover

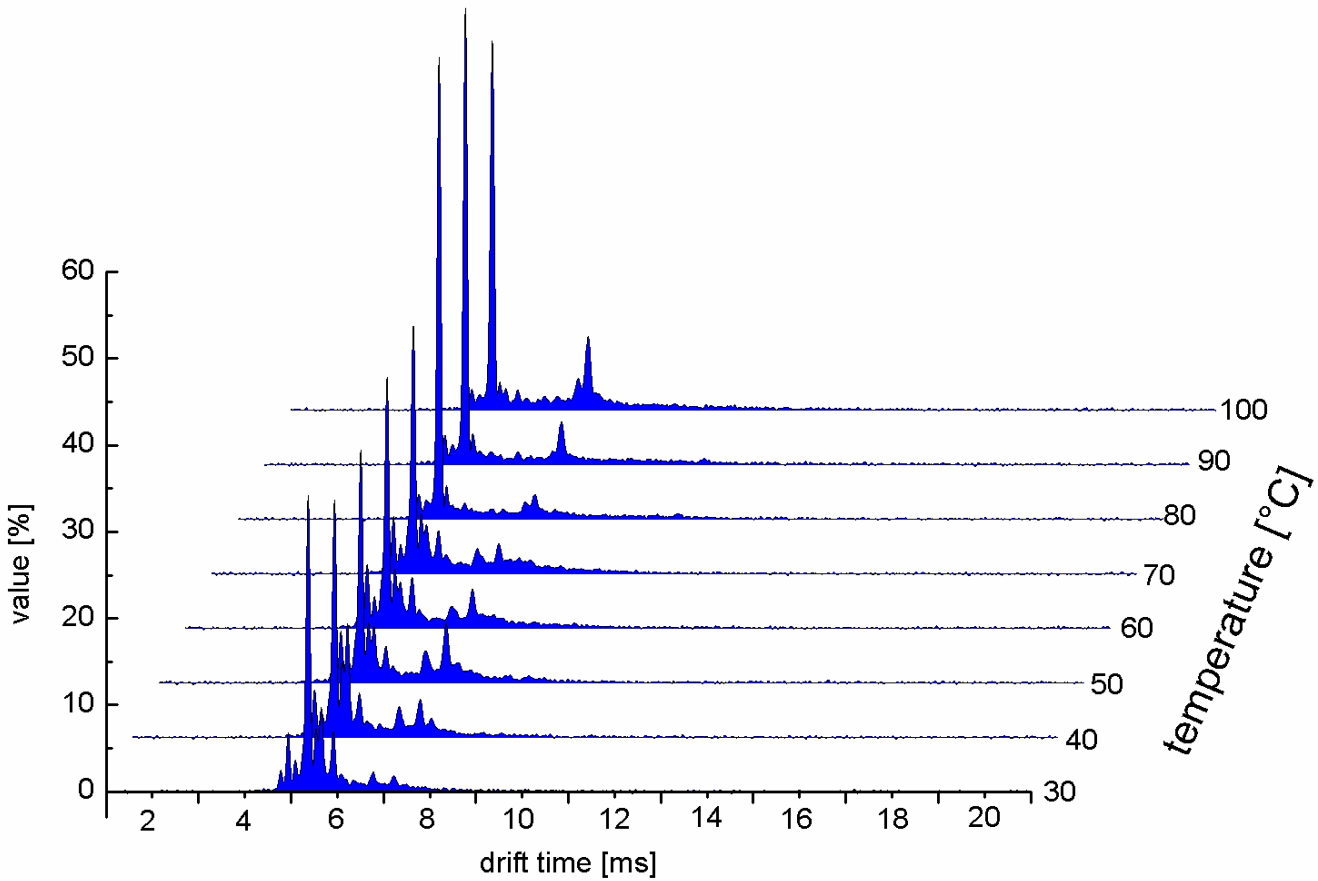

IMS
Pyrolysis head
Pyrolysis
control unit


I.U.T.

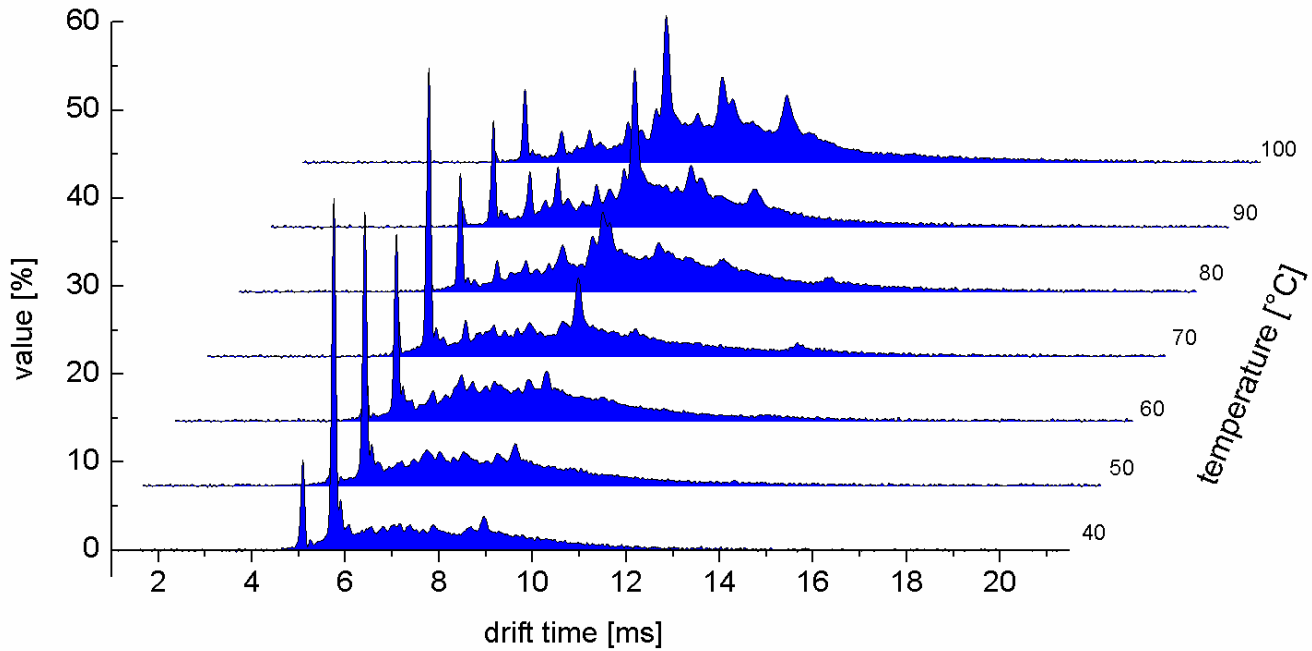
PA spectrum in the positive mode at temperature up to100°c.10 peaks are detected.



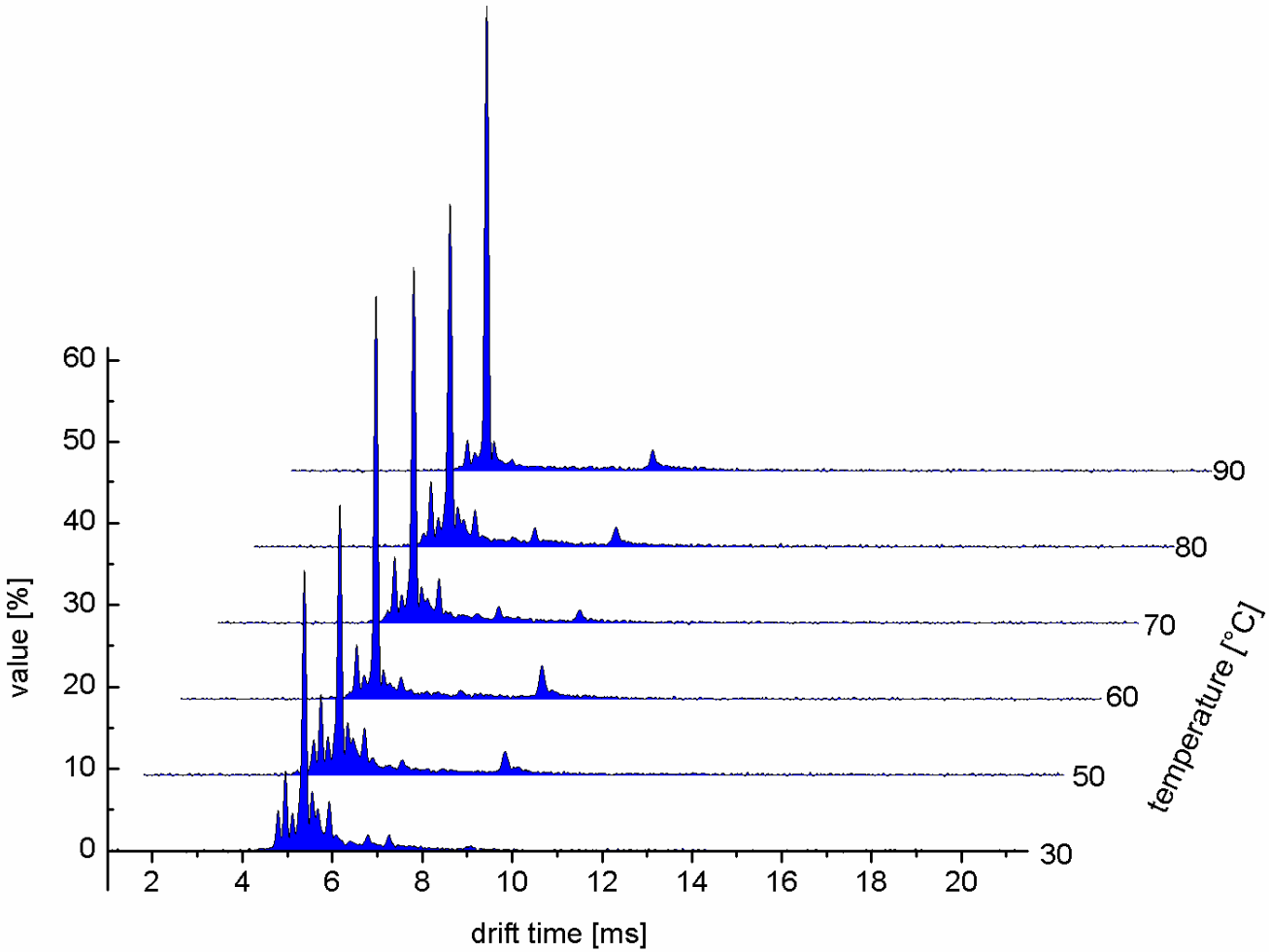
PA spectrum in the negative mode as function of temperature.



DPA spectrum in the positive mode in dependence on temperature

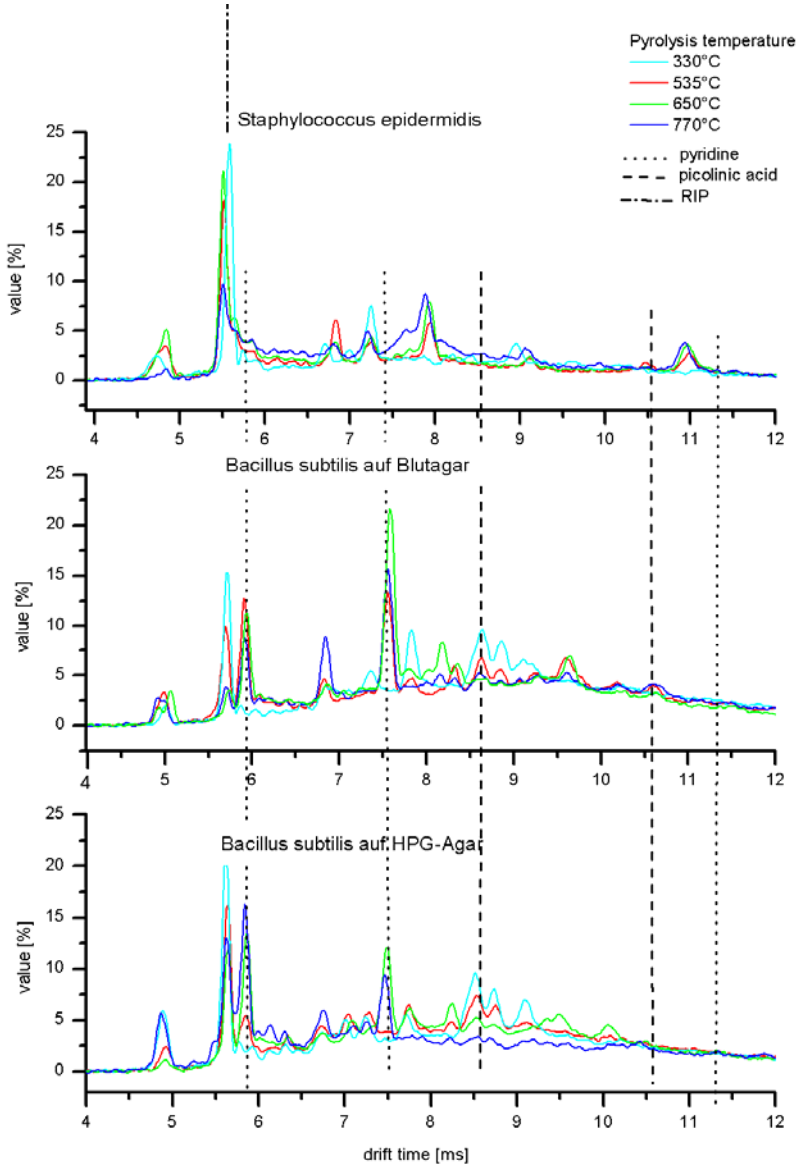


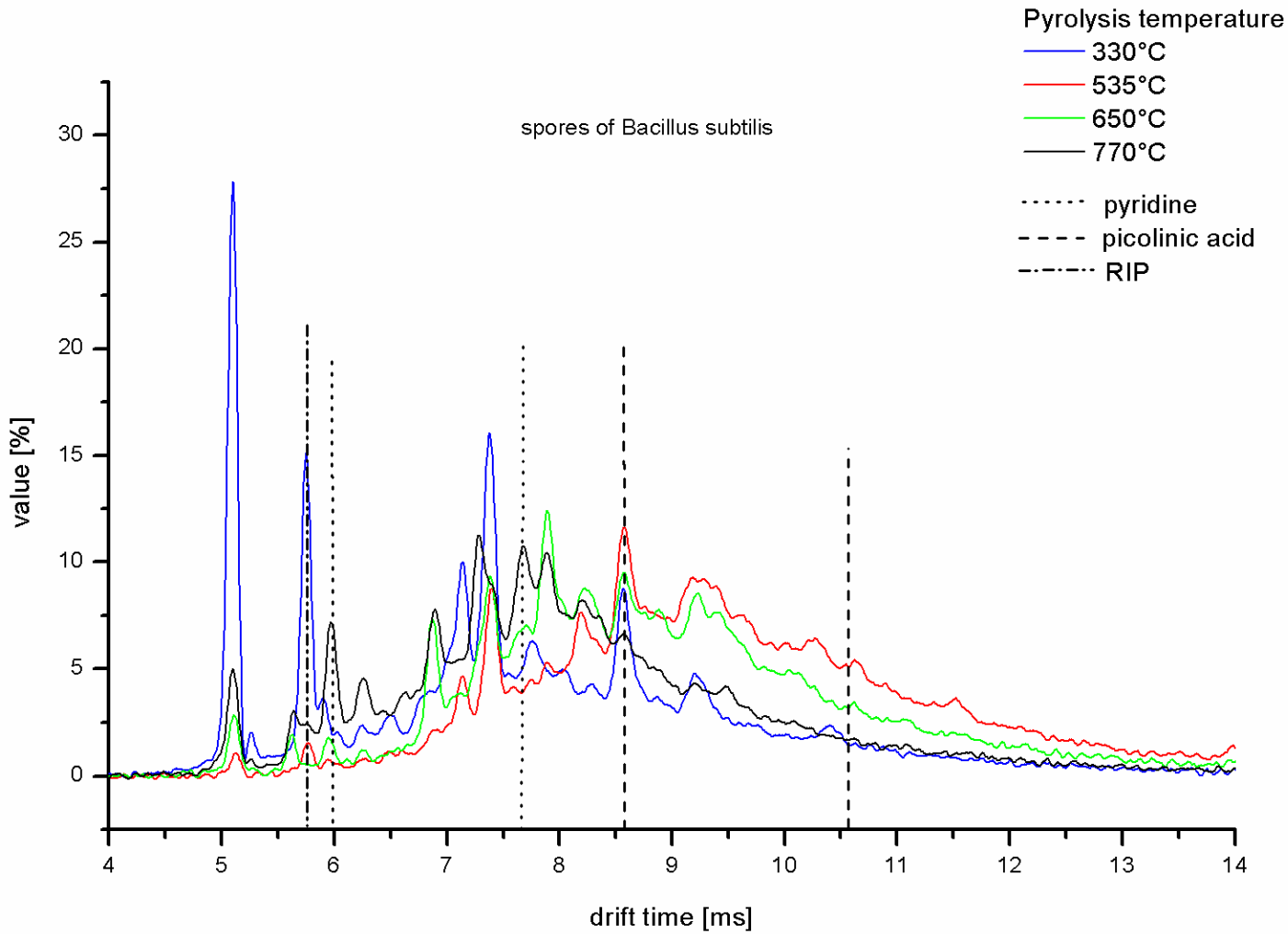
DPA spectrum in the negative mode in dependence on temperature

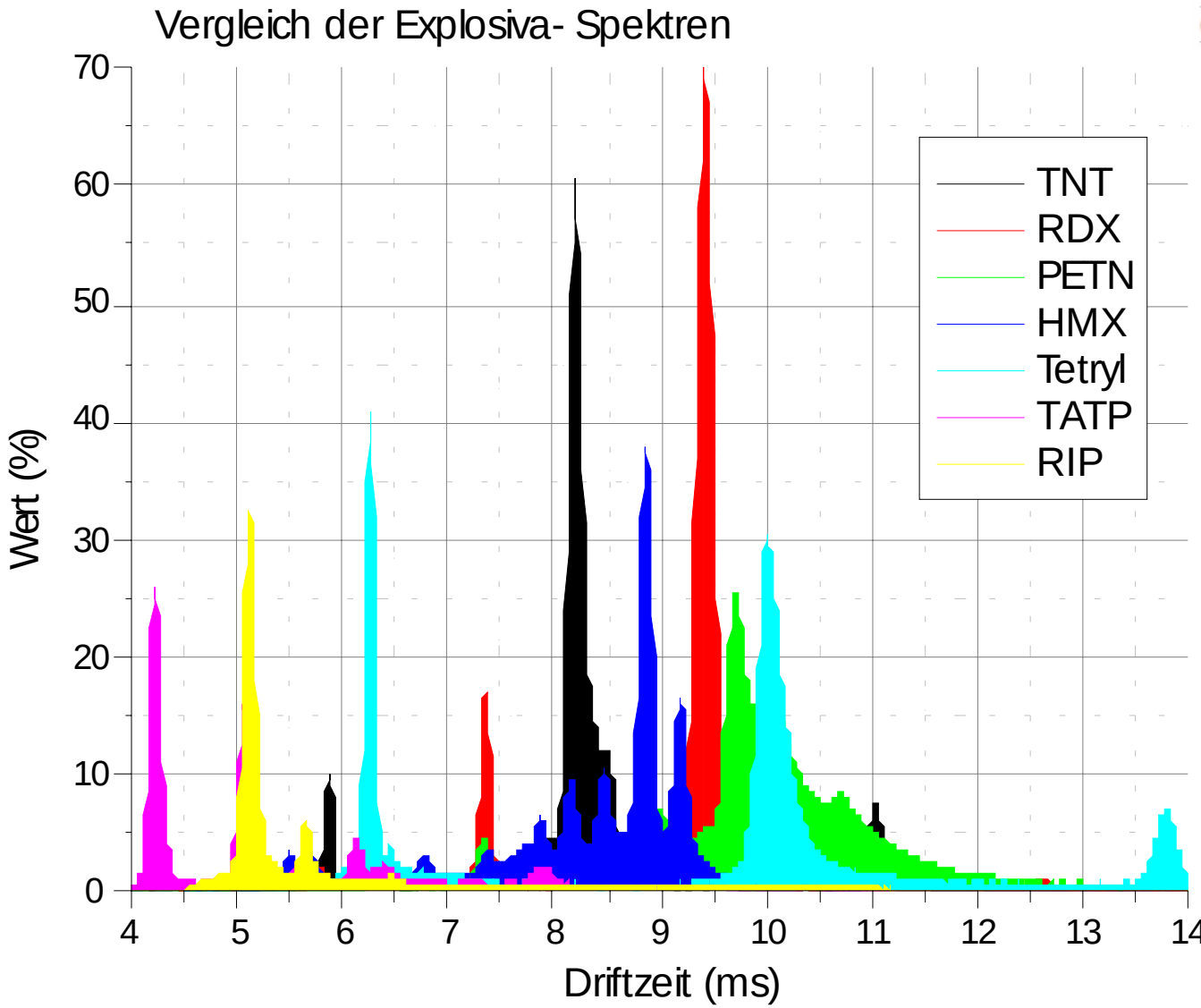


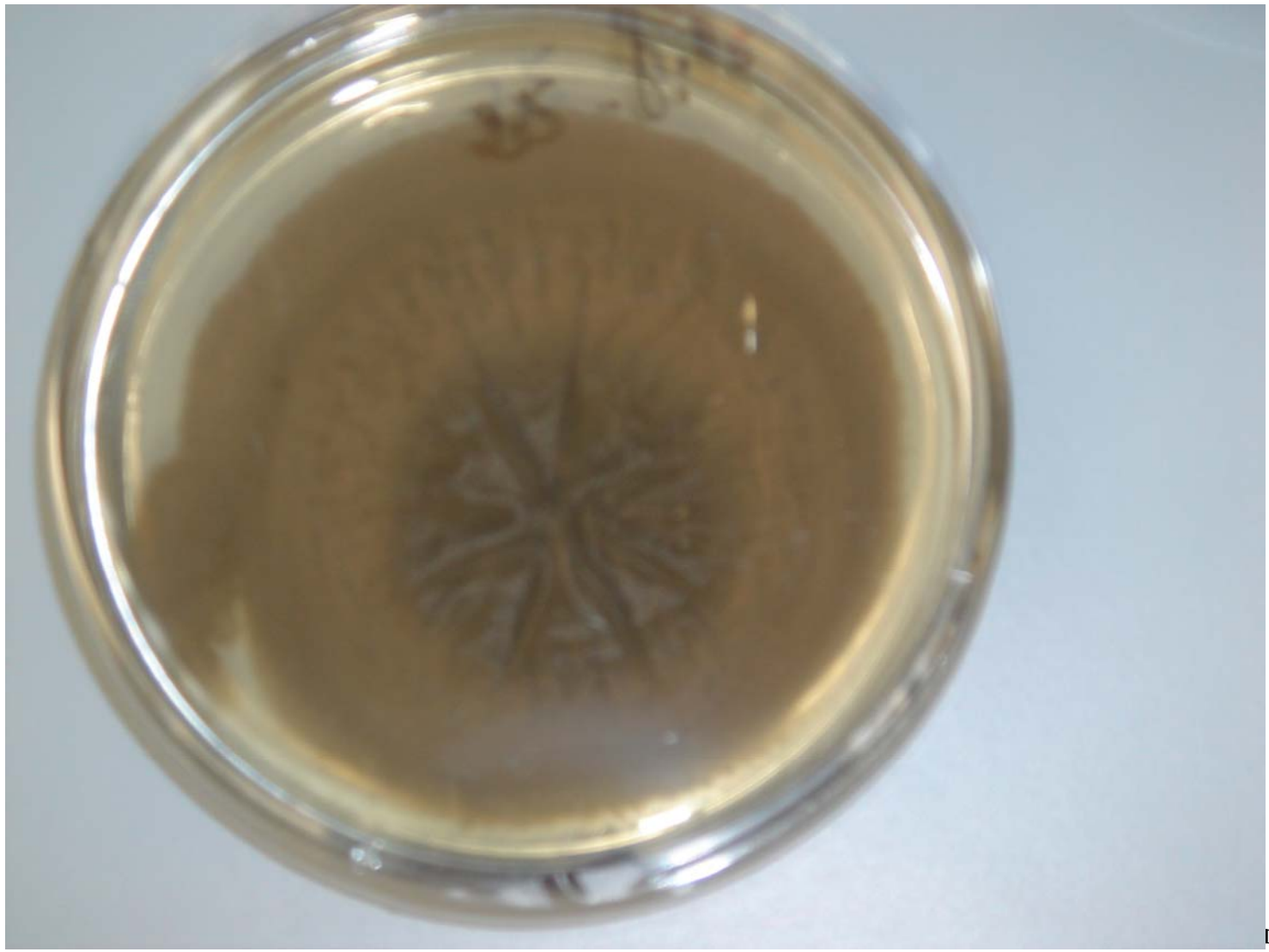
	K_0 in cm^2/Vs (experimental)		K_0- in cm^2/Vs (literature)	
	positive	negative	positive	reference
Pyridine - Monomer	1,932	-	2,21	Eiceman, 1994
Pyridine - Dimer	1,510	-	-	
Pyridine - Trimer	0,990	-	-	
Picolinic acid - Monomer	1,336	1,685	1,80	Snyder, 1999
Picolinic acid – destruction	1,087	1,573	-	
Picolinic acid - Dimer	0,915	1,530	1,46	Snyder, 1999
Dipicolinic acid	1,302	1,260	-	

Pea	retention time in min	peak area	peak heigth	half peak width in s	%-of all	name
1	9,267	314955	196777	1,60	1,20	Pyridine
2	9,408	83731	64885	1,29	0,32	Unknown
3	12,192	3462132	749656	4,62	13,17	Acetic acid
4	14,050	5219225	2877140	1,81	19,86	2-Furanmethanole
5	14,858	4353875	2038481	2,14	16,57	Acetamide
6	16,525	135986	52759	2,58	0,52	Unknown
7	19,325	960474	217930	4,41	3,65	2-Hydroxypyridine
8	20,592	3145658	1325559	2,37	11,97	Aziridine
9	21,433	1481562	662737	2,24	5,64	Pentadecan acid
10	21,600	3904906	1798910	2,17	14,86	Hexadecan acid
11	22,992	983810	342998	2,87	3,74	Isopropylpalmitate
12	23,892	1375179	420716	3,27	5,23	Heptadecan acid
13	24,333	860050	160633	5,35	3,27	Niacinamide


Pyrolysis temperature
330°C
535°C
650°C
770°C
pyridine
picolinic acid
RIP
Staphylococcus epidermidis
Bacillus subtilis auf Blutagar
Bacillus subtilis auf HPG-Agar
value [%]
drift time [ms]


spores of Bacillus subtilis
Pyrolysis temperature
330°C
535°C
650°C
770°C
pyridine
picolinic acid
RIP
value [%]
drift time [ms]
0
5
10
15
20
25
30
4
5
6
7
8
9
10
11
12
13
14


Vergleich der Explosiva- Spektren
Wert (%)
Driftzeit (ms)
0
10
20
30
40
50
60
70
4
5
6
7
8
9
10
11
12
13
14
TNT
RDX
PETN
HMX
Tetryl
TATP
RIP



+/- Spectra of a mold culture