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INFLAME

Migration Pathways: Project Update

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ESR2

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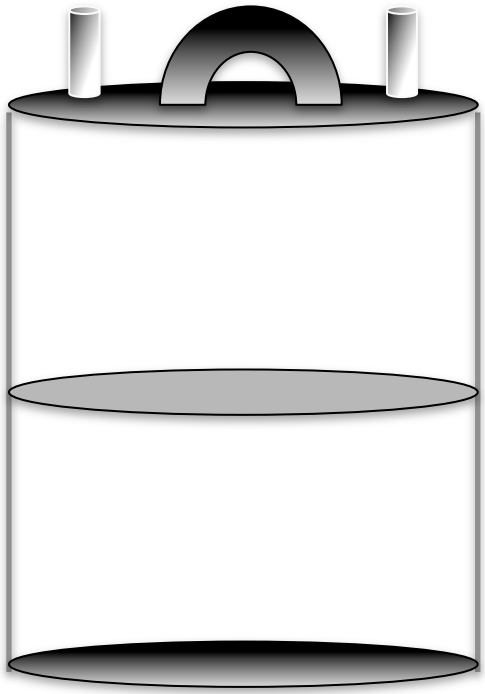
Micro emission test chambers



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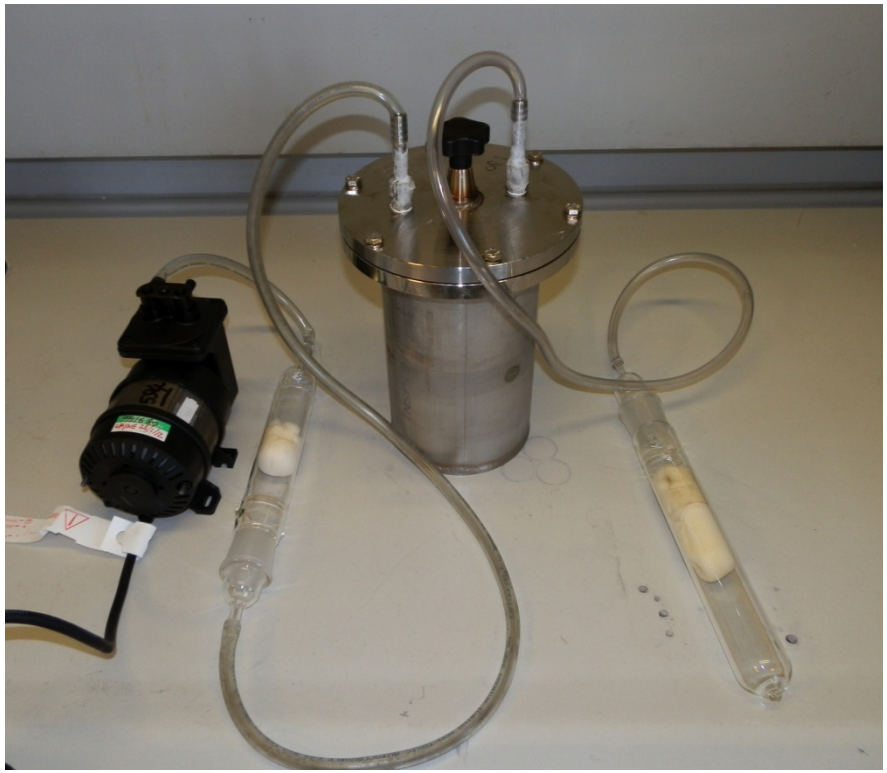
Emission Chamber Experiments



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Emission Chamber Experiments

- *Volatiles*: Mass balance experiments
  - Filter paper spiked with standards
  - Run low air flow pump through chamber
  - Analyse filter paper, PUFs, chamber wall washes separately after use
  - Sum up %Recovery

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Emission Chamber Experiments

- Influence of Temperature – 1 week experiments

Room Temperature (21 °C)

BFR	BDE-47	BDE-85	BDE-99	BDE-100	BDE-153	BDE-154	BDE-183	BDE-209		α-HBCD	β-HBCD	γ-HBCD
% on exit PUF	ND	ND	ND	ND	ND	ND	ND	ND		0.8	0.6	0.6
Total %Rec	*76*	*93*	*89*	*82*	*86*	*76*	*89*	*101*		*95*	*85*	*92*

Heated Chamber (60 °C)

BFR	BDE-47	BDE-85	BDE-99	BDE-100	BDE-153	BDE-154	BDE-183	BDE-209		α-HBCD	β-HBCD	γ-HBCD
% on exit PUF	63	17	36	57	5	13	0.7	0.9		1.7	0.6	1.0
Total %Rec	*63*	*42*	*53*	*66*	*45*	*41*	*71*	*114*		*86*	*53*	*41*

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Emission Chamber Experiments

- Sink Effects (% Recovery)

BFR	BDE-47	BDE-85	BDE-99	BDE-100	BDE-153	BDE-154	BDE-183	BDE-209		α-HBCD	β-HBCD	γ-HBCD
Filter Paper	5.3	21	13	10	59	35	71	85		94	65	74
Wash solvent 1	38	32	41	41	30	43	5.6	4.3		2.2	1.5	1.1
Wash solvent 2	3.5	6.3	5.8	5.1	5.9	9.6	1.2	0		1.2	0	0
Wash solvent 3	2.0	2.2	2.5	2.4	2.5	4.8	0.5	0		0	0	0
Total %Rec	**49**	**61**	**62**	**59**	**97**	**93**	**78**	**91**		**97**	**67**	**75**

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Emission Chamber Experiments

- ‘Tweaking’ system to improve Recoveries

	BFR	BDE-47	BDE-85	BDE-99	BDE-100	BDE-153	BDE-154	BDE-183	BDE-209		α-HBCD	β-HBCD	γ-HBCD
Room Temp	% on exit PUF	ND	ND	ND	ND	ND	ND	ND	ND		0.8	0.6	0.6
	%Rec	**76**	**93**	**89**	**82**	**86**	**76**	**89**	**101**		**95**	**85**	**92**
Heat 24 hrs	% on exit PUF	10	1.3	3.5	6.8	0.3	1.4	0.4	0.3		0.7	0.3	0.4
	%Rec	**30**	**82**	**71**	**60**	**76**	**78**	**86**	**88**		**105**	**40**	**39**
Chamber left equilibrate	% on exit PUF	21	2.0	10	19	0.4	1.5	0.5	0.5		1.7	0.6	1.0
	%Rec	**73**	**67**	**66**	**70**	**73**	**67**	**87**	**87**		**86**	**53**	**41**
Heat 1 week	% on exit PUF	63	17	36	57	5.2	13	0.7	0.9		0.3	0.1	0.2
	% on 80°C PUF	ND	3.8	2.1	1.6	3.1	4.7	0.6	1.8		ND	ND	ND
	%Rec	**63**	**42**	**53**	**66**	**45**	**41**	**71**	**114**		**59**	**9.3**	**9.9**

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Investigations of SRM 2585

- Old SRM batch – August 2009
  - Inconsistent results
- New SRM 2585 batch – February 2012
  - More reliable results
  - Possibility old SRM is past its used by date

- ‘In-house’ dust reference material prepared for further quality assurance measures

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Investigations of SRM 2585

- Results (ng/g)

	BFR	BDE-47	BDE-85	BDE-99	BDE-100	BDE-153	BDE-154	BDE-183	BDE-209		α-HBCD	β-HBCD	γ-HBCD
Old SRM 2585	Average (ng/mL)	455	47	991	170	129	82	51	2811		28	9	173
	Range	±326	±25	±247	±65	±40	±34	±16	±923		±6	±4	±215
New SRM 2585	Average (ng/mL)	475	42	786	134	106	74	41	2142		18	7	118
	Range	±25	±3	±41	±9	±17	±4	±5	±401		±4	±0.6	±28
Certified/ Indicative Values		498 ± 46	43.8 ± 1.6	892 ± 53	145 ± 11	119 ± 1	83.5 ± 2.0	43.0 ± 3.5	2510 ± 190		19 ± 3.7	4.3 ± 1.1	120 ± 22
In-house Ref Material	Average (ng/mL)	108	46	71	95	101	46	55	2386		277	120	1508
	Range	±28	±16	±23	±29	±22	±14	±48	±2174		±51	±18	±2269

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Presentations

- Abstract accepted for Marie Curie symposium "SCIENCE – Passion, Mission, Responsibilities", Warsaw, September 2011

- Poster presentation at 6th Annual Conference of the POPs network, Birmingham, April 2012

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Future work

- Investigations into HBCD results (thermal degradation??)
- Repeat experiments – consistent results
- Analyse real samples in chamber for volatiles profile (PUF furniture, carpets, etc)

- Secondment to VITO – September 2012

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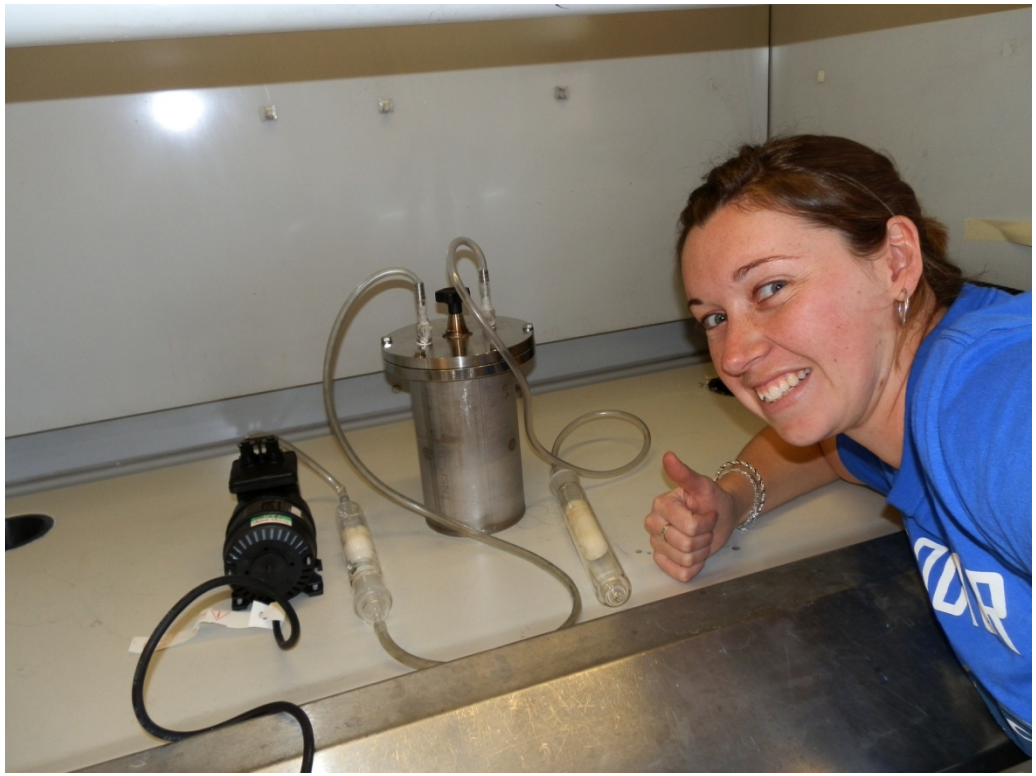
Thankyou



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