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FILTECH 2019

Koelnmesse · October 22–24, 2019

FILTECH

October 22 – 24, 2019
Cologne – Germany

The Filtration Event
www.Filtech.de

Abstract Book

International Conference & Exhibition for Filtration and Separation Technology

FILTECH 2019 · October 22–24

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FILTECH

October 22 – 24, 2019
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Session Overview

Monday 21.10.2019 09:00-18:00h
Short Course I · Solid/Liquid Separation
Short Course II · Fine Dust Separation

Tuesday, 22.10.2019

08:30	Registration				
10:15	Opening Session				
10:45 12:00	PL Plenary Lecture – Dr. Harald Anlauf, Academic Director – Karlsruhe Institute of Technology (KIT) / Germany Centrifugation – Key technology for solid/liquid/liquid separation				
	Lunch – Fair				
	Room 1A – 1st floor	**Room 1B – 1st floor**	**Room 2 – 2nd floor**	**Room 4A – 4th floor**	**Room 4B – 4th floor**
13:00 14:15	K1 Keynote Lecture 1 Prof. Dr. H. Nirschl	L1 Particle and Slurry Characterization	M1 Membrane Design and Characterization	G1 Air Filtration	F1 Enhancement of Filter Media by Surface Treatment
	Coffee Break – Fair				
14:45 16:00	K2 Keynote Lecture 2 Prof. Dr. A. Mukhopadhyayi	L2 Particle, Slurry and Cake Characterization	M2 Micro and Ultra Filtration	G2 Cabin Air Filters	F2 Progress in Wire Mesh Development
	Coffee Break – Fair				
16:45 18:00	L3 Cake Filtration - Influences on the Cake Structure	L4 Wet Particle Fractionation	F3 Advanced Filter Media Developments and Manufacturing Methods	G3 Gas and Particle Separation	G4 Mist and Droplet Separation
18:00	Get Together Reception				

Wednesday, 23.10.2019

	Room 1A – 1st floor	**Room 1B – 1st floor**	**Room 2 – 2nd floor**	**Room 4A – 4th floor**	**Room 4B – 4th floor**
09:00 10:15	L5 Cake Filtration - Characterization, Modelling, Scale-up	G5 Surface Filtration I	M3 Separation of Complex Systems	F4 Quality Control and Pore Size Analysis of Filter Media	F5 Bio-Inspired Innovation of Separation
	Coffee Break – Fair				
10:45 12:00	K3 Keynote Lecture 3 Dr.-Ing. S. Haep	L6 Cake Filtration - Characterization, Modelling, Simulation	M4 Ceramic Membranes and Fouling	G6 Surface Filtration II	F6 Performance Improvements of Nonwovens
	Lunch – Fair				
13:00 14:15	K4 Keynote Lecture 4 Dr.-Ing. G. Bickert	L7 Cake Filtration - Particle Washing	M5 Process and Waste Water Treatment	G7 Filter Test Systems I	F7 Advanced Composite Fiber Materials
	Coffee Break – Fair				
	Room 1A – 1st floor	**Room 1B – 1st floor**	**Room 4A – 4th floor**	**Room 4B – 4th floor**	
14:45 16:00	L8 Short Oral	L9 Short Oral	M6 Short Oral	G8 Short Oral	G9 Short Oral
16:00 16:45	Poster Presentation	Poster Presentation	Poster Presentation	Poster Presentation	Poster Presentation
	Room 1A – 1st floor	**Room 1B – 1st floor**	**Room 2 – 2nd floor**	**Room 4B – 4th floor**	**Room 2 – 2nd floor**
16:45 18:00	L10 Centrifugal Sedimentation Decanter Centrifuges	L11 Centrifugal Cake Filtration	F8 Micro and Nanofiltration Media	G10 Filter Test Systems II	G11 Modelling and Simulation

Thursday, 24.10.2019

	Room 1A – 1st floor	**Room 1B – 1st floor**	**Room 2 – 2nd floor**	**Room 4A – 4th floor**	**Room 4B – 4th floor**
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	Coffee Break – Fair				
10:45 12:00	L14 Dewaterability of Sludges	L15 Depth Filtration and Adsorption - Modelling and Simulation	F10 Numerical Analysis of Filter Media Pore Size and Structure	G14 Measurement Techniques II	G15 Filter Medium Design
	Lunch – Fair				
13:00 14:15	L16 Dewaterability of Sludges	L17 Backwashing Filtration	L18 Froth Flotation and Liquid/Gas Separation	G16 Particles for Filter Testing	F11 Numerical Methods for Filter Media Characterization & Improvement
	Coffee Break – Fair				
	Room 1A – 1st floor	**Room 1B – 1st floor**	**Room 4A – 4th floor**	**Room 4B – 4th floor**	
14:45 16:00	L19 Liquid/Liquid Separation	L20 Enhancement of backwashing and cake filtration performance	G17 Monitoring and Control	F12 Advanced Filter Media for Gas Filtration	

Programme is subject to amendments. Up-to-date Programme is available at www.Filtech.de

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K1	**Digitalization of Centrifuges – Helpful or senseless,** Prof. Dr. Hermann Nirschl, Karlsruhe Institute of Technology (KIT), Germany	13:00 14:15	10
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M1	**Membrane Design and Characterization** Session Chair: Prof. Allan Kuo-Lun Tung	13:00 14:15	188
G1	**Air Filtration** Session Chair: Prof. Dominique Thomas	13:00 14:15	50
F1	**Enhancement of Filter Media by Surface Treatment** Session Chair: Dr. Christine Sun	13:00 14:15	14
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F2	**Progress in Wire Mesh Development** Session Chair: Dr. Graham Rideal	14:45 16:00	17
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F3	**Advanced Filter Media Developments and Manufacturing Methods** Session Chair: Dr. Harald Anlauf	16:45 18:00	20
G3	**Gas and Particle Separation** Session Chair: Prof. Gerhard Kasper	16:45 18:00	56
G4	**Mist and Droplet Separation** Session Chair: Prof. Eberhard Schmidt	16:45 18:00	59

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NEW SYNTHETIC NANO-AEROSOL FOR ACCELERATED REALISTIC AGEING OF AIR FILTERS

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Politecnico di Torino – Corso Duca degli Abruzzi 24, 10129 Turin – Italy
*Corresponding and presenting author

ABSTRACT

To assess reliably the energy impact of air filters, it is essential to ascertain changes of their airflow resistance during their whole service life and not just when they are clean.

Current laboratory standards simulate the ageing of air filters by dispersing and loading synthetic dusts with particle size distribution (PSD) completely different from the particulate matter (PM) found in urban atmospheres. Since the size (diameter) of aerosol particles is especially important in determining the kinetics of the clogging process of an air filter, this technique does not replicate the real behavior of the filters in operation. The current methods used for artificial filter ageing are considered acceptable for rating and comparing the performance of air filters, but do not provide an accurate prediction of their airflow resistance increase in a real environment. Therefore, the duration and energy-use assessment of HVAC filters cannot be reliably estimated by means of current laboratory test dusts.

We describe various methods for generating nanoparticles having approximately the same particle size distribution of a typical urban aerosol, but at higher mass concentrations. The purpose is to allow accelerated ageing in a similar way to what happens in actual service conditions.

The paper describes the thermal aerosol generator chosen to produce the desired particle size distribution of the synthetic aerosol in an existing test rig according to ISO 16890:2016 specifications. This generator produces a high number of nanoparticles by burning a salt stick (e.g. made with KCl) with an oxy-propane flame. The salt vapor condenses in the air stream to form a cloud of ultrafine particles.

We present some preliminary data characterizing this thermal generator and we discuss some critical aspects to standardize the new ageing procedure with a synthetic aerosol closely representing a typical urban atmosphere.

KEYWORDS

Aerosol Generation, Ageing, Dust Loading, Nano Aerosols,
Particle Size Distribution, Test Dust.

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