

# The COST Action MP1105 on Flame Retardancy: A European opportunity for Cutting Edge Research



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# COST Action MP1105

## FLARETEX :

**Sustainable flame retardancy for textiles and related materials based on nanoparticles substituting conventional chemicals**

**Start date: 23/05/2012**

**End date: 22/05/2016**

**Chair : Prof. Dr. Paul KIEKENS**



## FLARETEX Objectives

- To build a European multidisciplinary Knowledge Platform on Sustainable Flame Retardancy
- To facilitate the rapid development and commercialisation of fire safe textiles and related materials of low toxicity and ecotoxicity, using all available/novel technologies
- To promote cooperation between researchers from different scientific disciplines



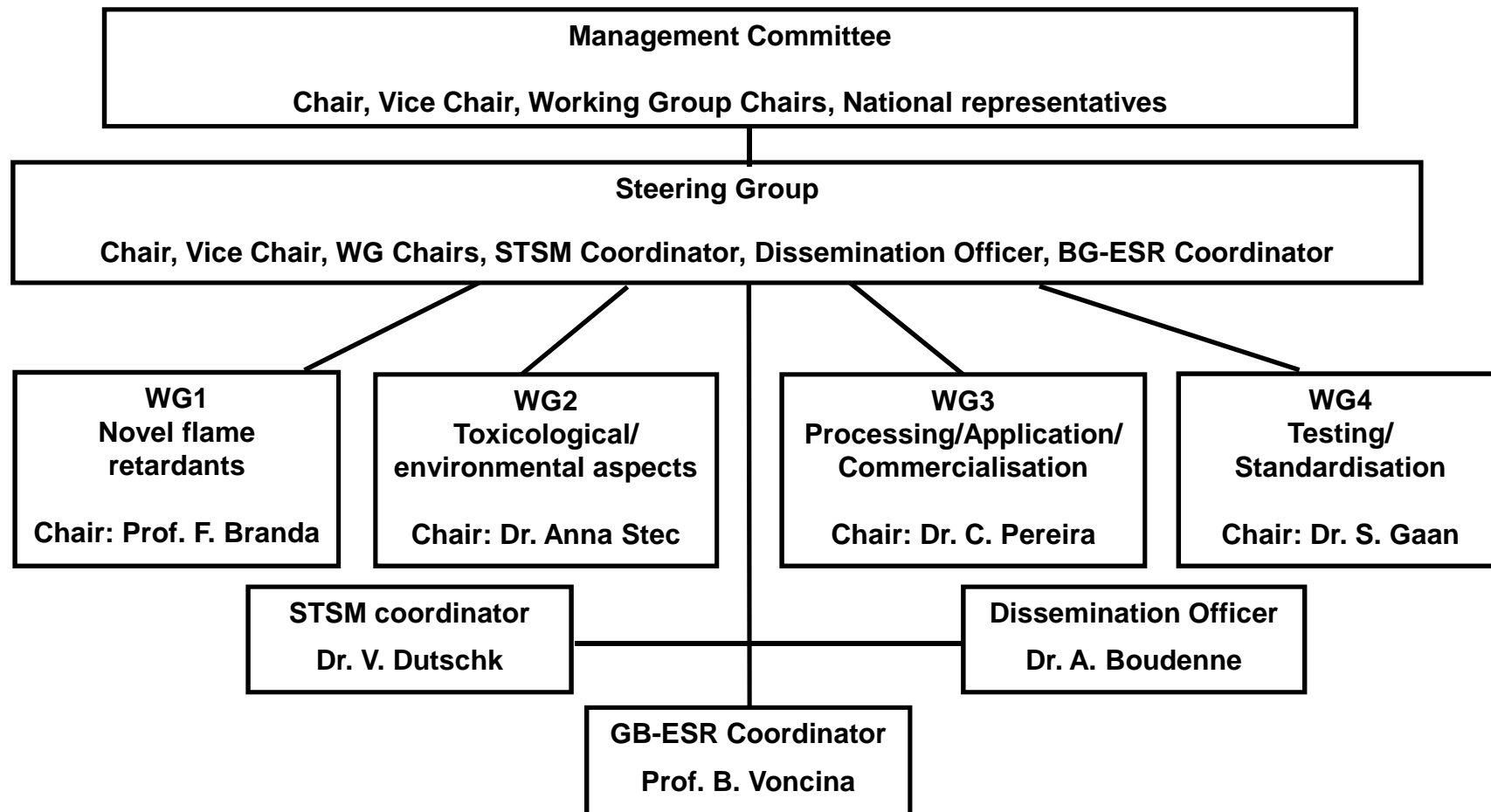
## Research directions

- Identification of safer alternatives to halogenated FRs
- Development of new and sustainable nanobased FR systems for synthetic fibres/textiles
- Analysis of their effectiveness, durability, (smoke) toxicity and particularly environmental impact (LCA)
- Synergistic effect of nanomaterials with conventional FRs
- Environmentally friendly surface treatment and application processes for FR
- Explanation of the FR mechanism of action of nanostructured materials
- Drawing up testing methods, standards and requirements

**FLARETEX is the first organised multidisciplinary scientific and technology network on Sustainable Flame Retardancy**



# Action Management Structure



# COST MP1105 Working Groups

## **WG1 - Novel Flame Retardants (Prof. F. Branda, Dr. G. Malucelli, IT):**

New and environmentally friendly nanobased FR systems, synergistic effects derived from combining nanoparticles with conventional FRs and their potential effectiveness

## **WG2 - Toxicological/environmental aspects (Dr. A. Stec, UK) :**

FRs obtained in WG1 will be investigated for their fire toxicity, ecotoxicological and environmental impacts (LCA)

## **WG3 - Processing/Applications/Commercialisation (Dr. C. Pereira, PT) :**

Various application processes (e.g. plasma coating, spinning, sol-gel, ...) will be studied, developed and optimised

## **WG4 - Testing/Standardisation (Dr. S. Gaan, CH) :**

New test methods and performance standards will be developed

# Significant Highlights in Science

- **The use of nanoparticles for flame retardancy, including natural and hybrid nanoparticles**
- **Increased use of P-based flame retardants as alternative for halogen based FRs**
- **The use of natural (= green) flame retardants**
- **The use of layer-by-layer deposition and sol-gel technology**
- **The use of multifunctional (nano)chemicals combining flame retardancy with other properties, such as water and oil repellency, breathability, crease resistance, anti-microbial, ...**
- **Development of instrumental and computational tools for investigation of polymer nanocomposite flammability**

# Significant Highlights in Networking

Industrial workshop on 'Flame retardant functionalisation of textiles in industrial wet-chemical processes', Enschede, NL, 5/10/2012 : 37 participants



1<sup>st</sup> Steering Group meeting + 1<sup>st</sup> meeting of all 4 WG's, Paris, FR, 12-13/11/2012 : 44 participants

Scientific workshop on 'Innovative Flame Retardant Systems (applications and testing)', Maribor, SI, 27-28/03/2013 : 65 participants



MC meeting + Scientific workshop on 'Nanoparticles for flame retardancy: challenges and risks', Krakow, PL, 15-16/05/2013 : 85 participants  
Conference proceedings published

Scientific workshop on Electrospun Nano-fibres for bio inspired composite materials and innovative industrial applications in textiles (in cooperation with MP1206), Istanbul, TR, 30-31/05/2013 : 63 participants



## FLARETEX Action Activities

- FLARETEX conferences
- Workshops
- Training schools
- Short Term Scientific Missions (STSM)!!!
- Standardisation Meetings
- Dedicated FLARETEX website
- Initiating joint research projects



## Activities 2<sup>nd</sup> year

- **30 June – 4 July 2013**, Lille, FR : COST MP1105 workshops within Fire Retardancy and Protection of Materials Conference (FRPM'13)
- **17 September 2013**, Naples, IT : Scientific workshop “Multifunctional textiles based on hybrid coatings and nanoparticles”
- **14-15 October 2013**, Bolton, UK : Standardisation meeting “Flame retardant textiles/textile composites: Legislative landscape, EU vs. member states”
- **12-14 February 2014**, Porto, PT : Training School “Flame Retardant Solutions for Fibre Reinforced Composites”
- **14 April 2014**, Preston, UK : MC meeting
- **15-17 April 2014**, Preston, UK : Joint COST MP1105 FLARETEX and FRT14 Conference with 1-day scientific workshop “Replacement of Halogenated Flame Retardants in Upholstered Furnishings
- **8 May 2014**, Dubendorf, CH : Scientific workshop “Development of Flame retardants for the future”

## Innovations / Targets

- Use of nanoparticles/nanocomposites, e.g. functionalised clays, silsesquioxanes, silanes, CNT, carbon nanofibres
- Synergy : conventional + novel FRs
- Environmentally benign (greener) FRs
- Smart flame retardants
- Safety of FRs
- New intumescent systems
- Multifunctional FRs : also antimicrobial, antistatic performance, crease-resistant, etc.

## FLARETEX : Challenges for the next generation of eco-friendly flame retardants

- **Polymeric FRs** : use of large molecules (oligomers, polymers)
- **Reactive products** : bound to the building polymer
- **Non-toxic**, non-bioaccumulative, non-persistent, non-carcinogenic, non-mutagenic
- **Durable**, non-leaching (insoluble), non-hydrolysable
- **Reduced** total loading

## Eco-toxicological aspects

- Green(er) technology
- Human and environmental safety; toxicity and risk performance
- LCA : - life cycle inventory  
- impact assessment
- REACH

## FLARETEX Final goal

Establishing a sustainable and performant platform in which

- industry
- institutes
- academics



work in close cooperation to the benefit of society.

## Participating COST countries

Parties							
Country	Date		Country	Date		Country	Date
Austria	14/12/2011		Belgium	20/01/2012		Bulgaria	21/08/2012
Czech Republic	27/03/2012		Denmark	20/01/2012		Finland	26/01/2012
Germany	18/01/2012		Greece	14/02/2012		Italy	13/01/2012
Netherlands	17/01/2012		Poland	18/01/2012		Portugal	06/01/2012
Slovakia	23/03/2012		Slovenia	05/01/2012		Spain	09/01/2012
Switzerland	24/01/2012		Turkey	11/05/2012		United Kingdom	06/12/2011
						Croatia	29/12/2011
						France	10/02/2012
						Lithuania	20/03/2012
						Romania	18/10/2012
						Sweden	20/02/2012

Total: 23



## Non-COST country

- South Africa : Council for Scientific and Industrial Research





## More information

- E-mail : [COST.MP1105@UGent.be](mailto:COST.MP1105@UGent.be)
- COST MP1105 website :  
<http://www.FLARETEX.eu>
- On COST website :  
[http://www.cost.eu/domains\\_actions/mpns/Actions/MP1105](http://www.cost.eu/domains_actions/mpns/Actions/MP1105)
- General information about COST :  
<http://www.cost.esf.org>





## **2BFunTex@Eurofinish 2013**

### **Innovation Seminar annex Matchmaking Event on Functional Textiles**

**23 October 2013, Ghent, Belgium**

**Info : <http://b2match.eu/eurofinish2013>**

## **Start-up Multidisciplinary team on Flame Retardancy**

**24 October 2013, Ghent, Belgium**

**Info : [info@2bfuntex.eu](mailto:info@2bfuntex.eu), [www.2bfuntex.eu](http://www.2bfuntex.eu)**



# Thank you for your attention!

