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

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Ghent University, Department of Textiles
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

Management Committee
Chair, Vice Chair, Working Group Chairs, National representatives

Steering Group
Chair, Vice Chair, WG Chairs, STSM Coordinator, Dissemination Officer, BG-ESR Coordinator

WG1 Novel flame retardants
Chair: Prof. F. Branda

WG2 Toxicological/environmental aspects
Chair: Dr. Anna Stec

WG3 Processing/Application/Commercialisation
Chair: Dr. C. Pereira

WG4 Testing/Standardisation
Chair: Dr. S. Gaan

STSM coordinator
Dr. V. Dutschk

Dissemination Officer
Dr. A. Boudenne

GB-ESR Coordinator
Prof. B. Voncina

COST MP1105 Standardisation meeting
Bolton, 14-15 October 2013
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

1st Steering Group meeting + 1st 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 2nd 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”
- **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

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Total: 23
Non-COST country

- South Africa: Council for Scientific and Industrial Research
More information

• E-mail: COST.MP1105@UGent.be
• COST MP1105 website: http://www.FLARETEX.eu
• On COST website: http://www.cost.eu/domains_actions/mpons/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, www.2bfuntex.eu
Thank you for your attention!