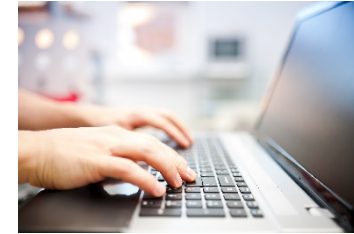


Overview of fire retardants solutions PIN Flame Retardants in PVC cables

PVC4cables Conference
Lyon – France – 26 October 2017

Philippe Salémis, Reiner Sauerwein



Content

- **Who is Pinfa**
- PIN Flame Retardants
- Fire Safety and Flame retardants efficacy
- PIN FR's in Cables : Overview of fire retardants solutions
- Conclusions

Pinfa, mission, vision, raison d'être

- the **Phosphorus, Inorganic and Nitrogen Flame Retardants Association**
 - established in 2009 as a Sector Group within **Cefic**, the European Chemical Industry Council
 - 29 members
-
- Pinfa members are **committed to sustainable fire safety via environmentally- friendly flame retardants**



Pinfa members' shared vision :

- **Vision:** continuously improving the environmental and health profile of their flame retardant products, offering innovative solutions for sustainable fire safety
- **Concept** of an ideal flame retardant:
 - fit for purpose, not toxic, risk and hazard controlled
 - does not migrate out of finished products
 - does not contribute to release additional toxic or corrosive gases in case of fire
 - does not impede the recycling of finished materials
 - degradable in the environment or remains neutral as naturally occurring substances
- **Commitment:** providing safe and none hazardous products to enable high fire safety standards which minimize the risk of fire to the general public

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Flame Retardants

Bromine

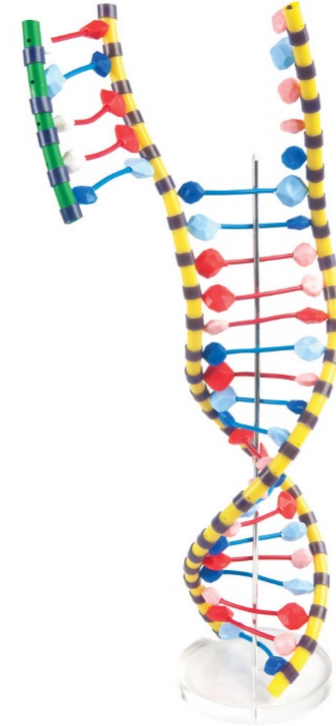
Chlorine

Antimony

Phosphorus

Inorganic compounds

Nitrogen



PINFA

Content

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Fire Safety and Flame retardants efficacy

- Several questions are asked about flame retardants:
 - - Why Flame retardants ?
 - - What do they do for the fire safety ?
 - - Are they useful ?
 - - Are they sustainable chemicals?
- This short [video](#) is aimed at providing some answers.



Content

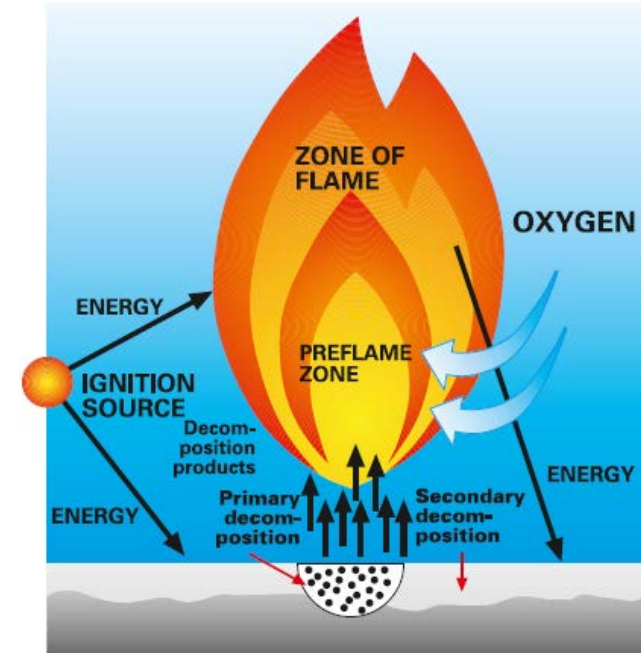
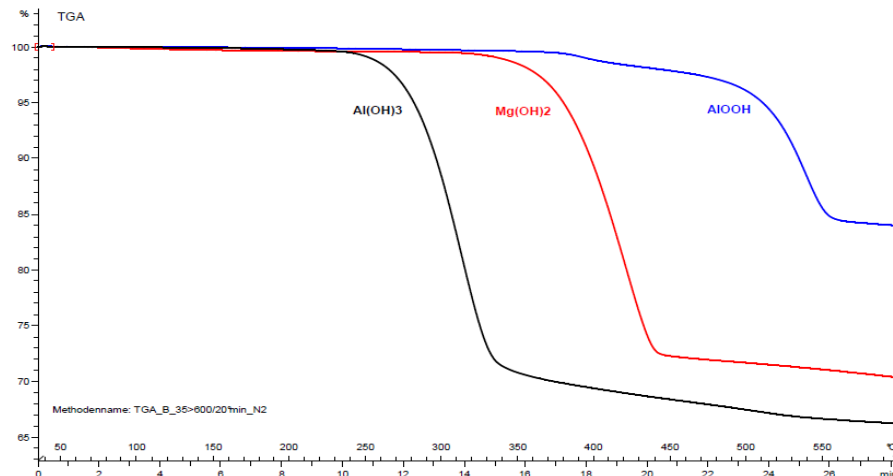
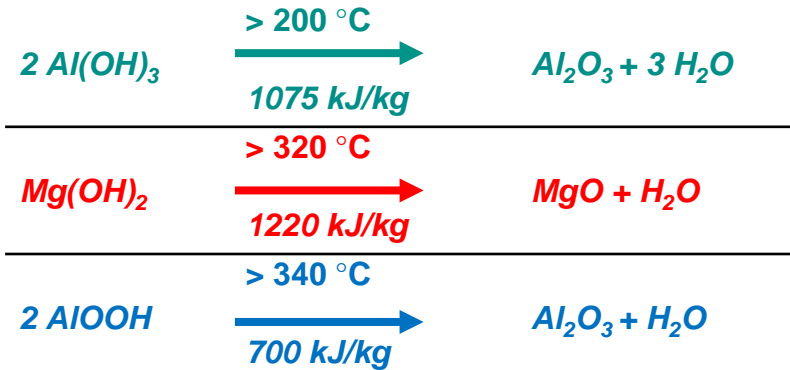
- Who is Pinfa
- PIN Flame Retardants
- Fire Safety and Flame retardants efficacy
- **PIN FR's in Cables : Quick overview of fire retardants solutions**
- Conclusions

PIN FR's in Cables : Overview of fire retardants solutions

- Mostly from the following starting chemicals :
 - Aluminium
 - Magnesium
 - Phosphate
 - Zinc

- “Product selector”: Showing regulatory status and possible applications.
<http://www.pinfa.org/index.php/en/product-selector>

PIN FR's in Cables : Metal hydrates of Al and Mg

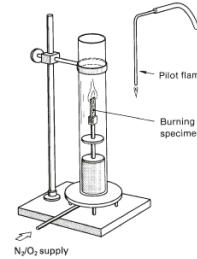


- Energy consumption
- formation of oxide layer
- cooling of surface
- thinning of burnable gases

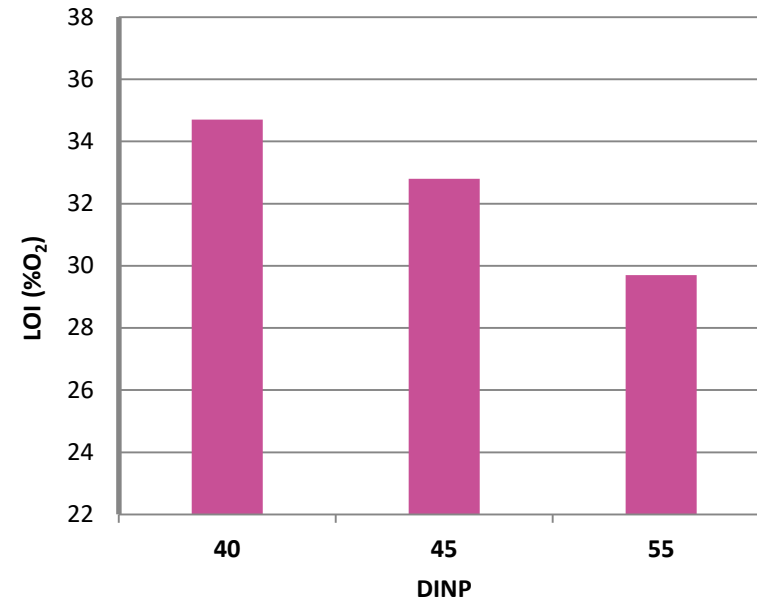
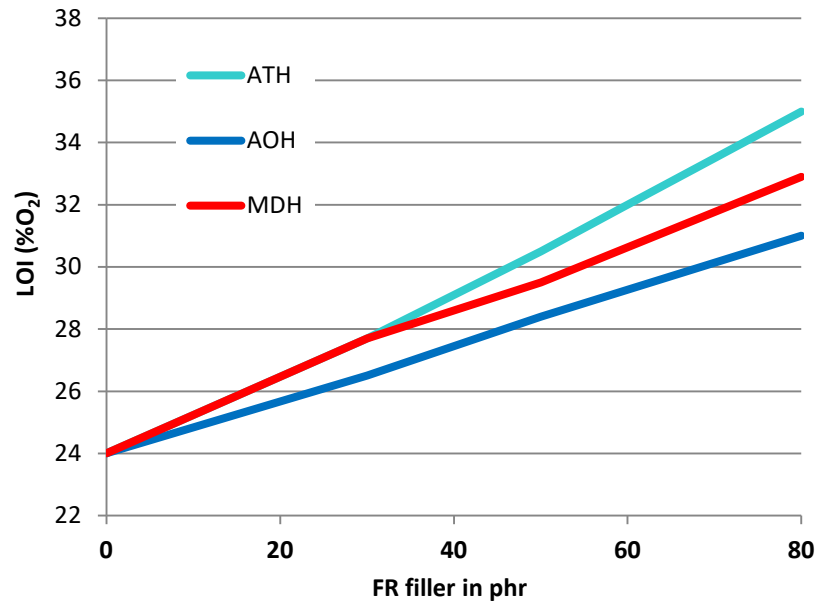
PIN FR's in Cables : Flammability and FR loading

PVC	100
DINP	50
Ca/Zn-Stabilizer	5
PE-Wax	0.5
ATH / AOH / MDH	0 - 80

LOI =
Limiting
Oxygen
Index



PVC	100
DINP	40 - 55
Ca/Zn-Stabilizer	5
PE-Wax	0.5
ATH	50



PIN FR's in Cables : Smoke reduction

ATO - reduced

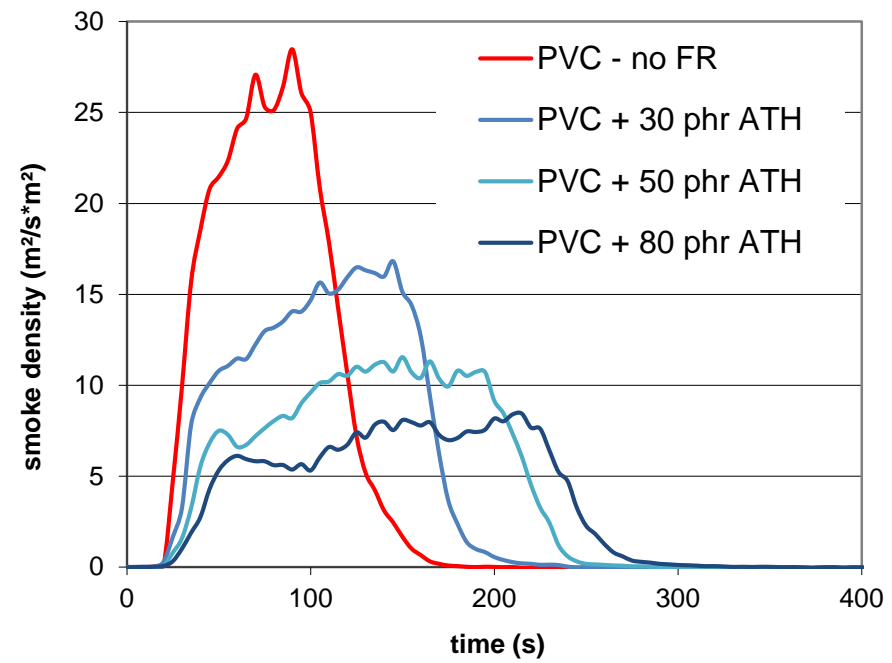
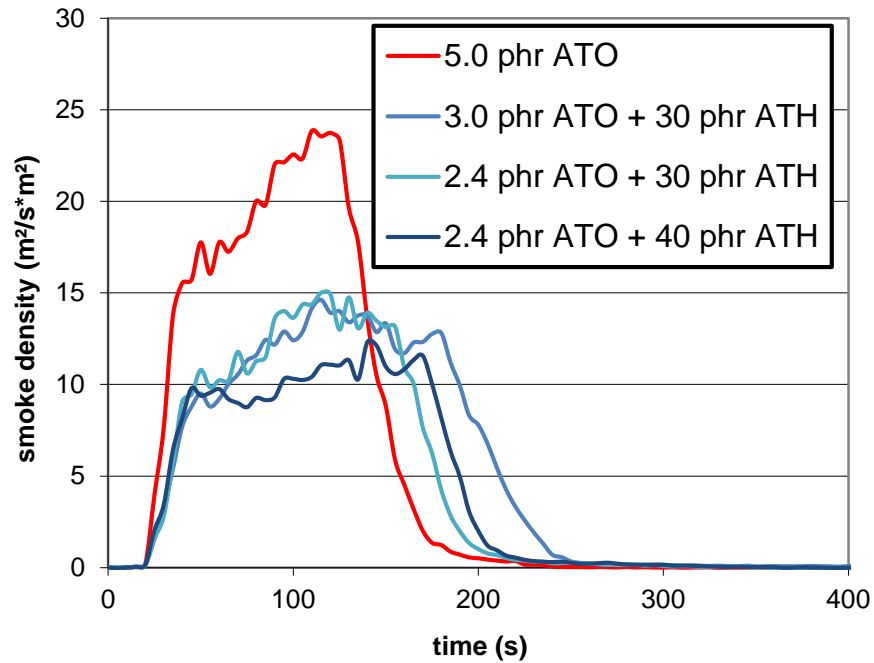
PVC	100
DINP	50
Ca/Zn-Stabilizer	5
PE-Wax	0.5
ATO + ATH	5 - 33

Cone
Calorimetry



ATO - free

PVC	100
DINP	50
Ca/Zn-Stabilizer	5
PE-Wax	0.5
ATH	0 - 80



PIN FR's in Cables : Overview of FR solutions

- Other Chemistries not covered in this presentation
- Zn- Borate (Smoke suppression synergist)
- Sn derivatives

- On going developments....

- “Product selector”: Showing regulatory status and possible applications.
- <http://www.pinfa.org/index.php/en/product-selector>

Conclusions

- PIN Flame Retardants are effective solutions to combat fire
 - PIN Fr's nicely couple with PVC and act as smoke reducer in case of fire
 - Generally no restrictions on pin FR's
-

Thank you for your attention

Philippe Salémis, *General Secretary* psa@cefic.be

Tel : +32 2 676 74 36

Dr Reiner Sauerwein, Nabaltec - pinfa member

More info visit: www.pinfa.org