

# International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)

Balapur P.O., Hyderabad – 500005, Telangana, India



## Flame Retardant Coatings on Fabrics

### Overview

There has been a recent requirement of halogen-free flame retardant (FR) finish for textiles due to the toxic nature of halogenated flame retardant finish on fabrics. In addition, organic solvent based formulations have also come under scrutiny in recent years. Hence, water-based and halogen-free sol-gel composition is a basic requisite for synthesis of safe and eco-friendly flame retardant formulations for fabrics. The halogen-free, water-based sol-gel coating formulation developed by ARCI when deposited on fabrics was found to increase the limiting oxygen index, provide substantial flame retardant property after ignition and self-extinguishment of the flame even if ignited. The process uses nanoscaled metal oxide powders in conjunction with a sol-gel matrix, that can provide flame retardant property along with good adhesion to the fabrics.

### Key Features

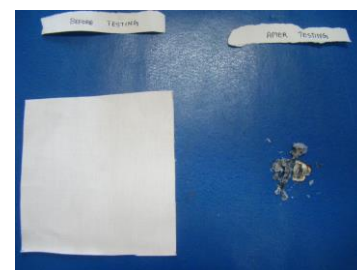
- Limiting oxygen index: 37.5 % for FR treated cotton vis-à-vis < 21% for untreated cotton
- FR treated fabric does not ignite or even if ignited, self-extinguishes after 2 sec
- Can be applied on cotton, nylon, polyester
- Simple methods like dipping or padding can be used for FR treatment
- Coatings can be cured very rapidly using Near Infrared (NIR) radiation

### Potential Applications

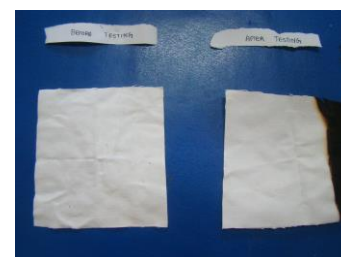
- Curtains in Air Conditioned Compartments of Railway Coaches
- Curtains in Air Conditioned Buses
- Fire fighting Garments
- Laboratory Aprons

### Intellectual Property Development Indices (IPDI)

- Performance and stability are validated at laboratory scale
- Scale-up and prototype validation to be carried out



Photographs of untreated cotton fabric before and after flame test



Photographs of treated cotton fabric before and after flame test showing large area of unburnt fabric

Status	1	2	3	4	5	6	7	8	9	10

### Major Patents / Publications

1. An Improved Coating Composition to Provide Flame Retardant Property to Fabrics and Process of Preparing the Same - to be filed shortly

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