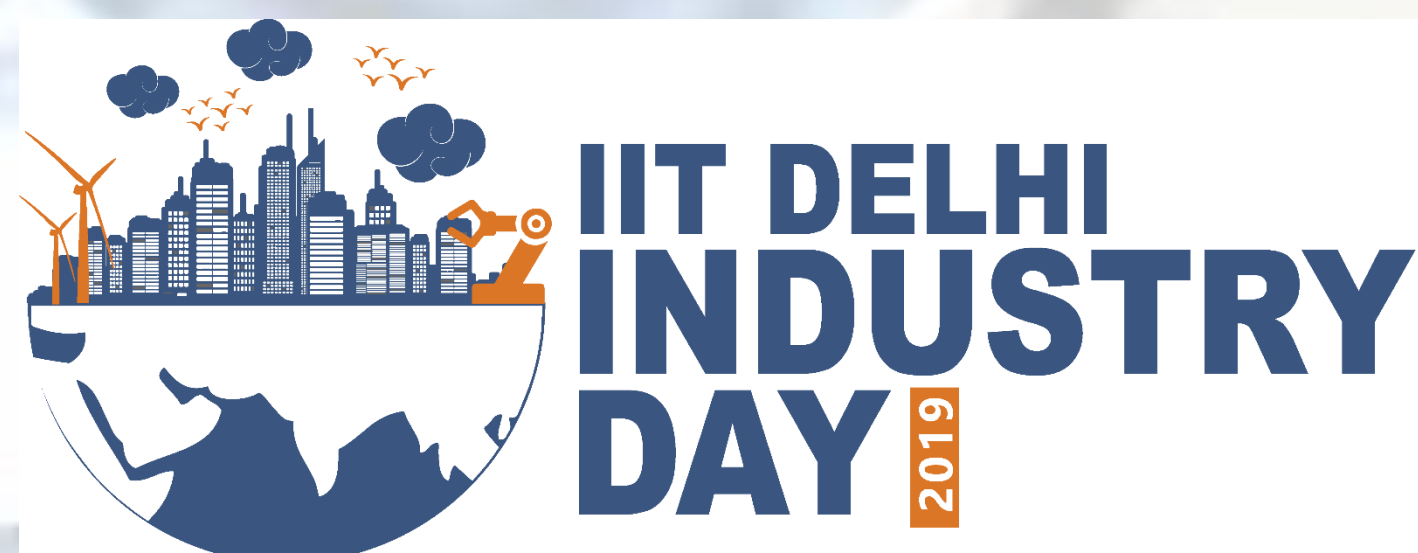


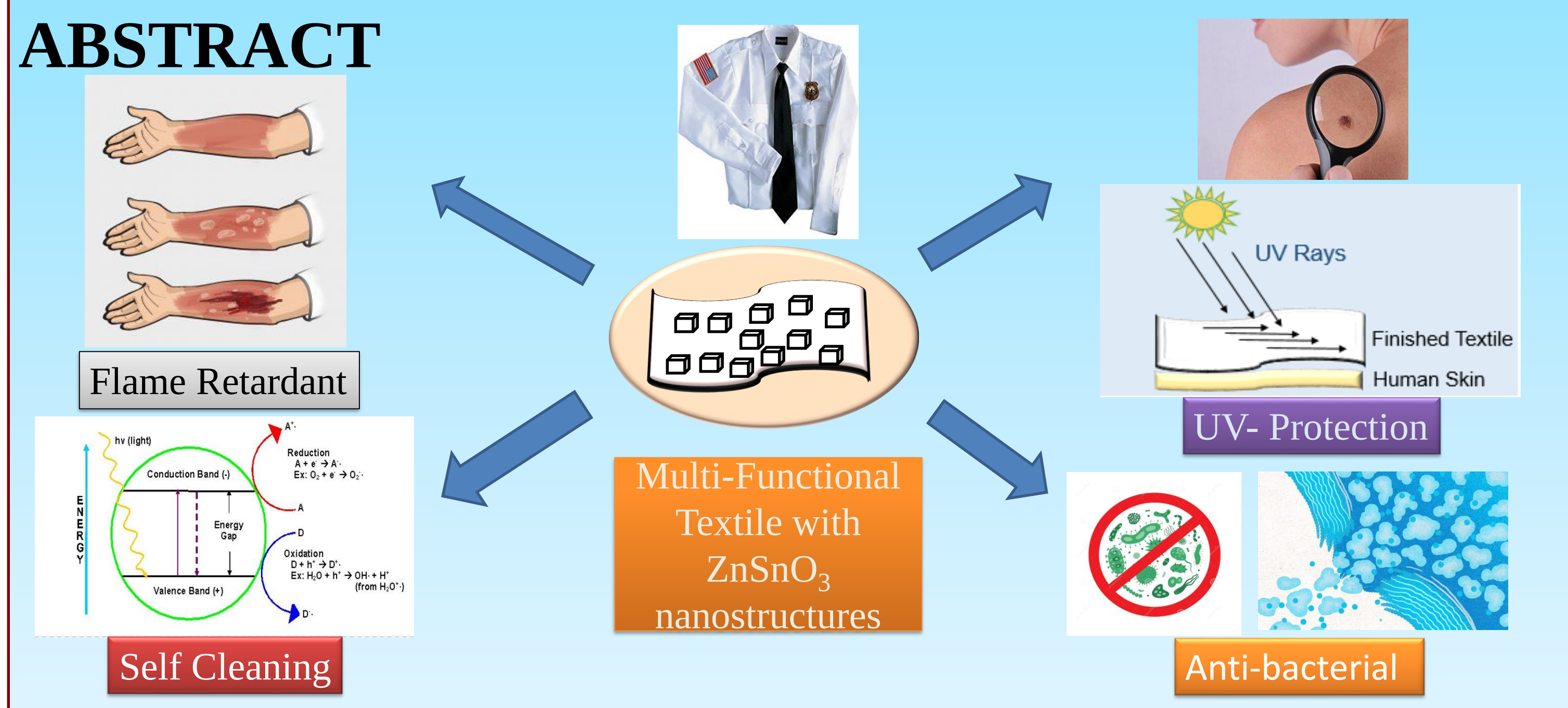
Industry Day Theme # Emerging Nano and Advanced Materials (ENA)

Zinc Stannate Nanostructures: An advanced alternative for multifunctional protective textile

Subhadeep Paul, S. Wazed Ali*



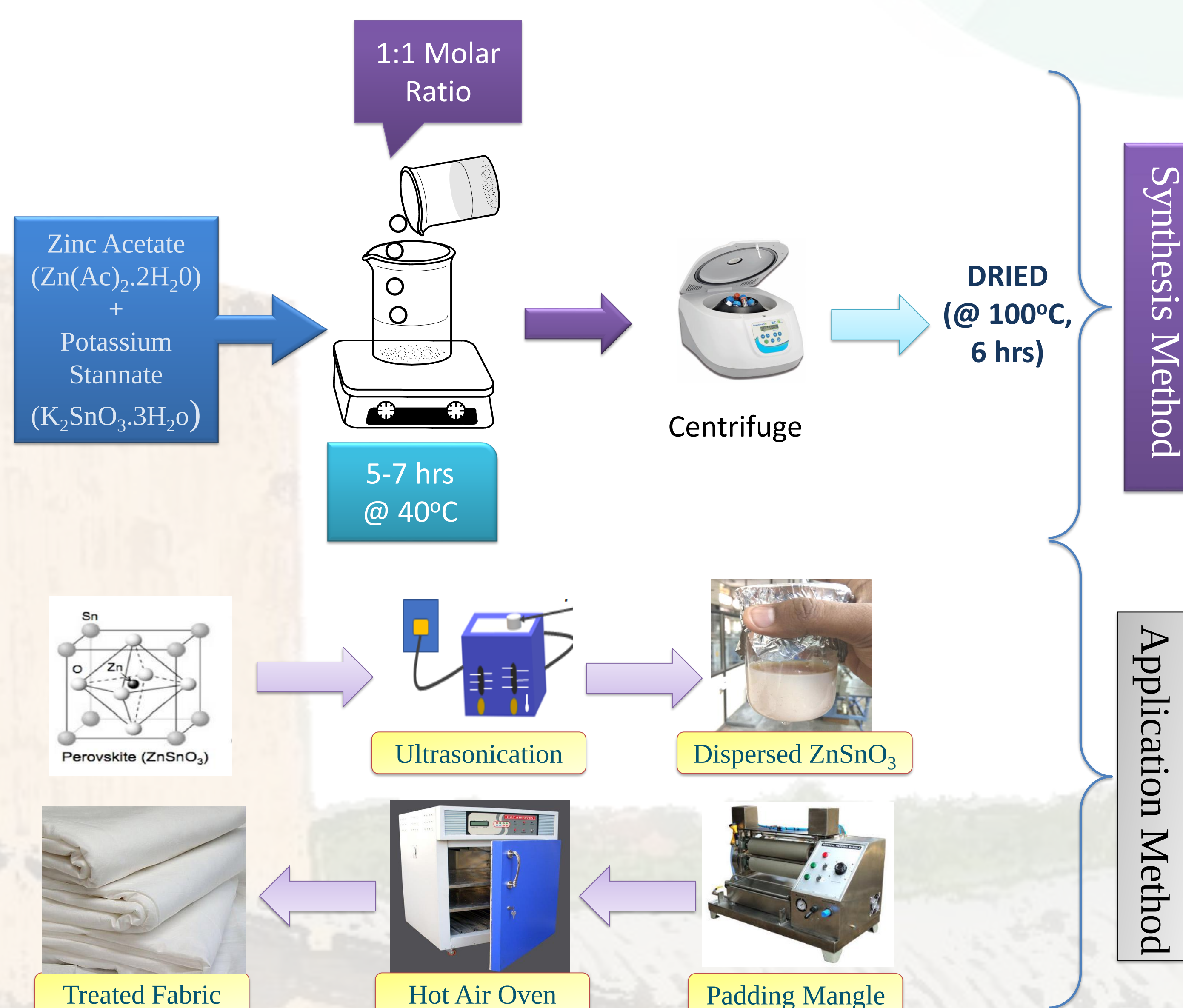
ABSTRACT



INTRODUCTION

- Multi-functional properties by single finishing agent is more eco-friendly and sustainable approach in terms of energy and chemical saving
- Nontoxic in terms of health conscience
- Better than current in-organic materials like ZnO, TiO₂ and other metal oxides

MATERIALS AND METHODS



CONCLUSIONS

- Successful Synthesis and characterisation of ZnSnO₃ nanostructures
- Incorporation of ZnSnO₃ nanostructures on cotton fabric and its characterisation
- UV Protection factor of **48** was achieved for annealed treated fabric
- Both the fabric showed good antibacterial properties
- Self-cleaning properties were excellent for the as-synthesized treated fabric
- The treated fabric showed good fire resistant properties with decrease in peak heat release rate by **39 %**

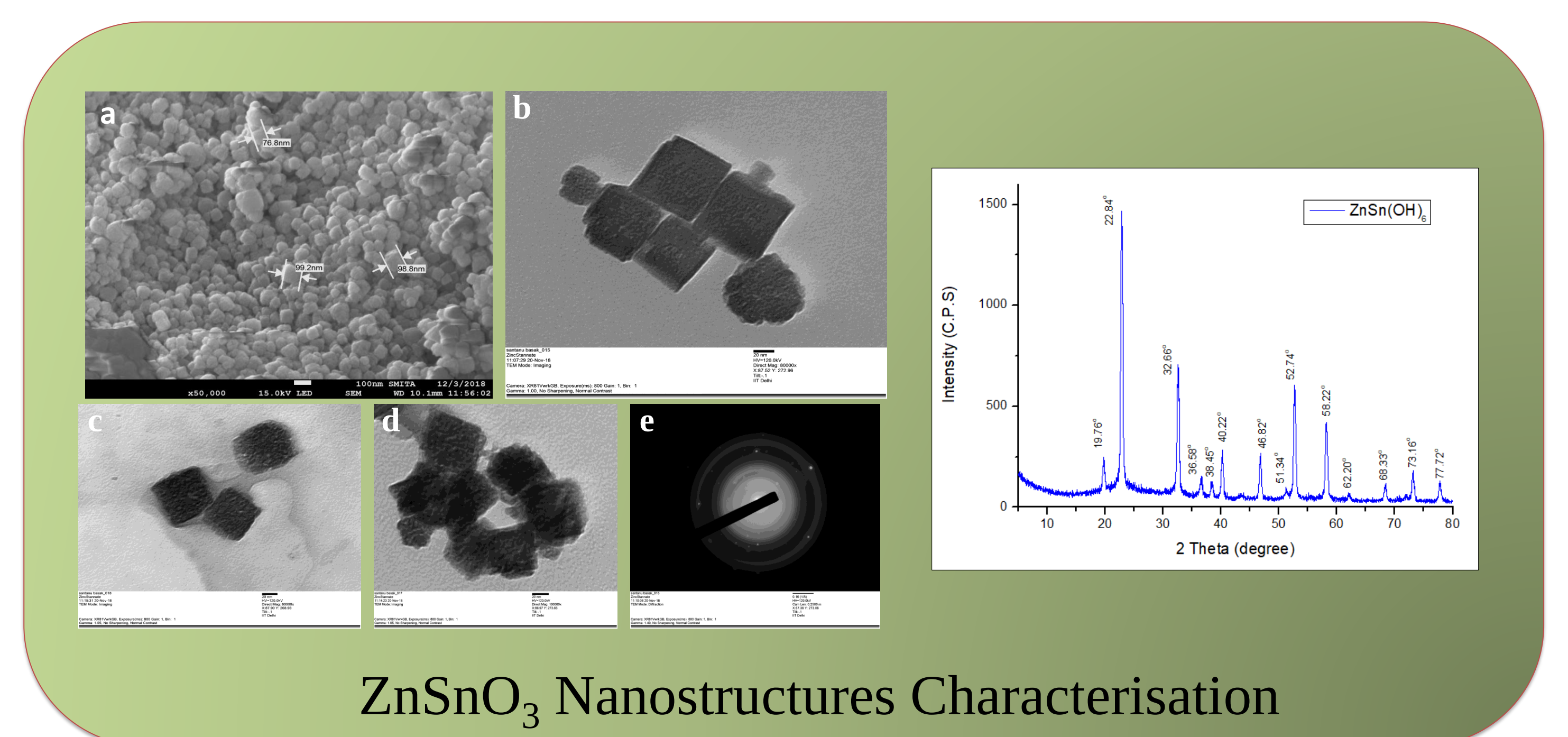
Industrial Significance:

Promising **multifunctional** technical textiles which can be more effective than conventional finished textiles

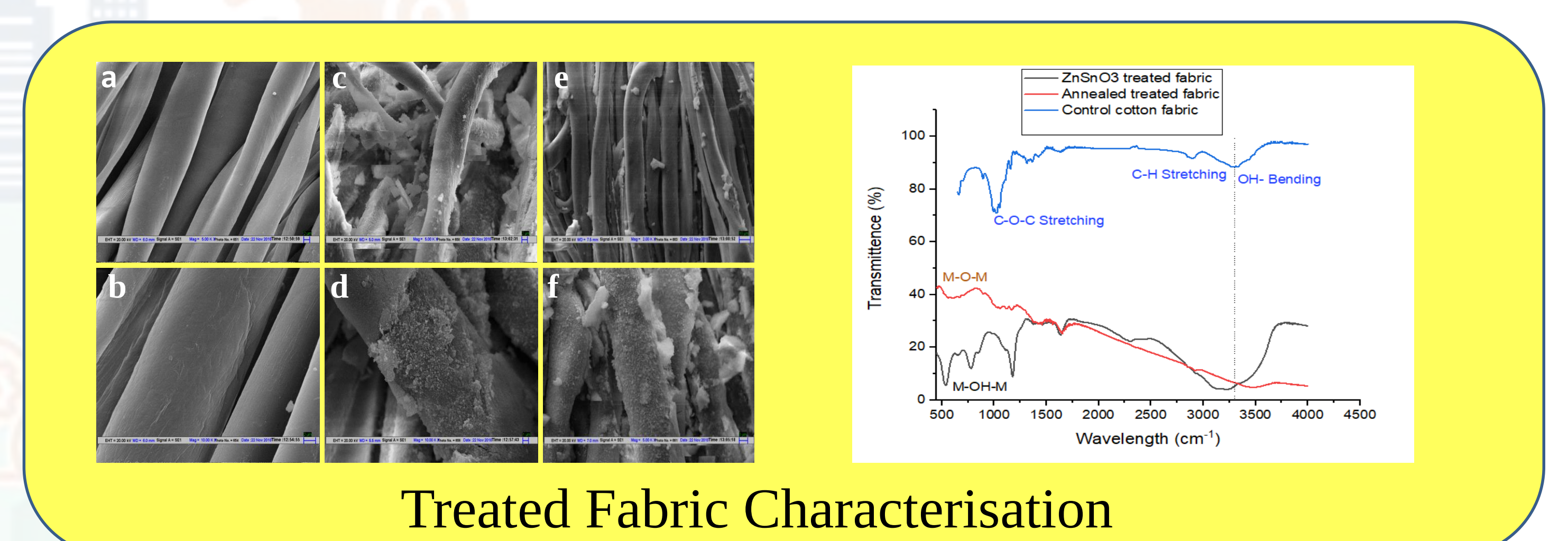
Technology Readiness Level:

- Proposed technology successfully demonstrated in laboratory scale
- Ready for textile industry where laundering is not required
- For Apparel development of durability is under progress

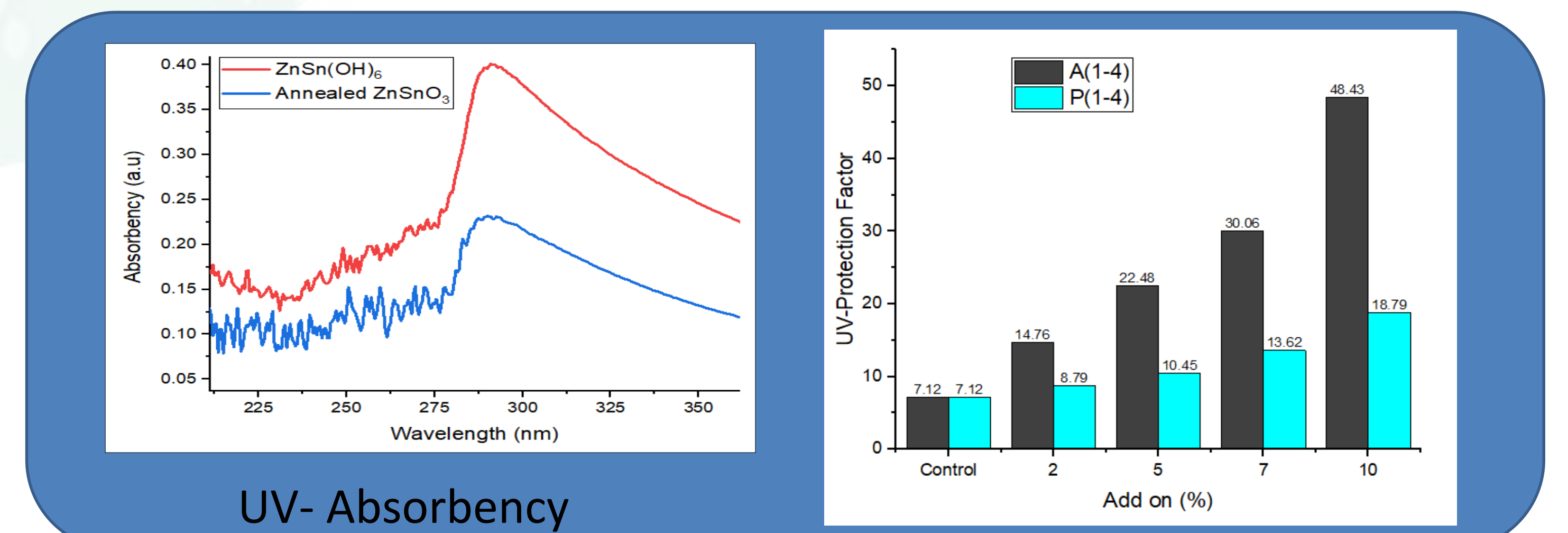
RESULTS



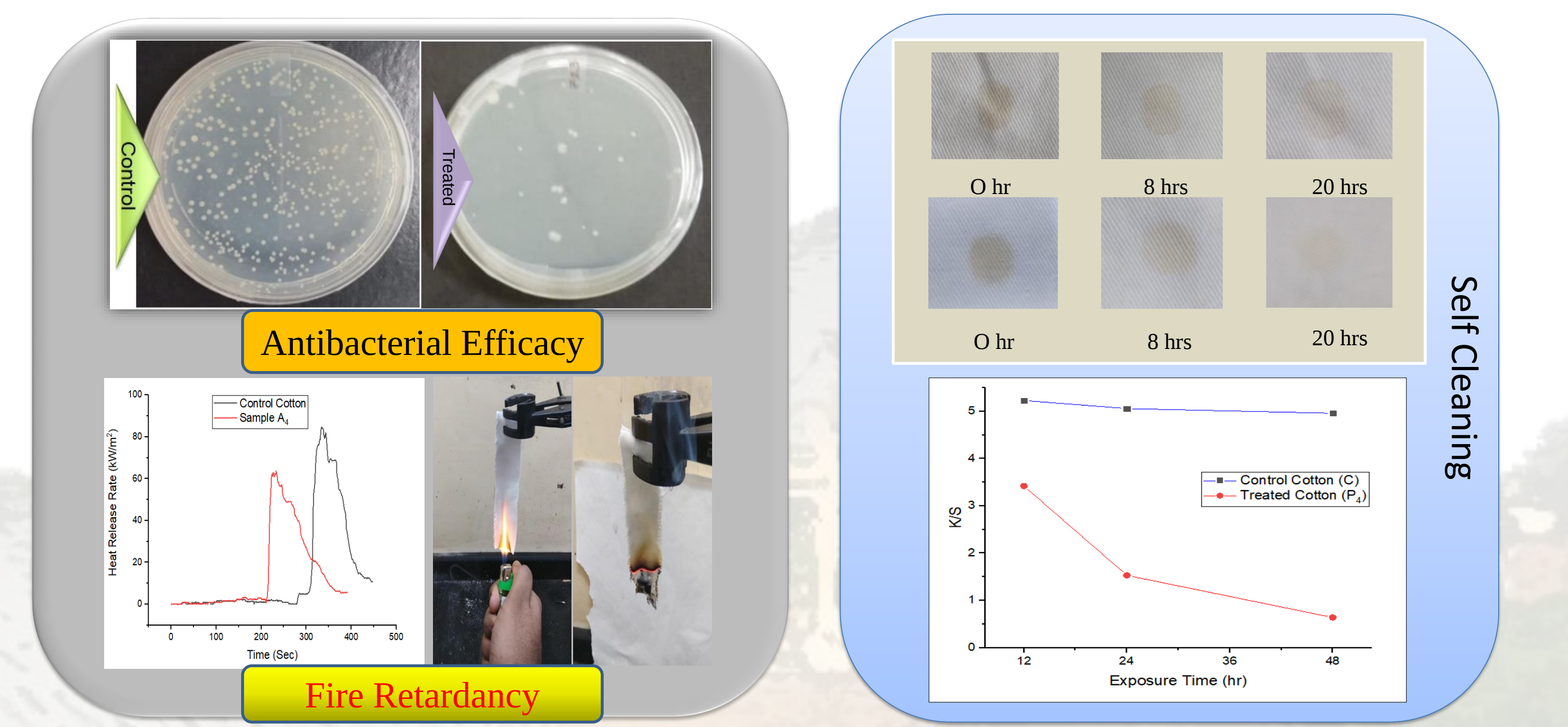
ZnSnO₃ Nanostructures Characterisation



Treated Fabric Characterisation



UV- Absorbency



REFERENCES

1. Basak, S., and S. Wazed Ali. "Wastage pomegranate rind extracts (PRE): a one step green solution for bioactive and naturally dyed cotton substrate with special emphasis on its fire protection efficacy." *Cellulose*: 1-23.
2. Chen et al. "An evolution from 3D face-centered-cubic ZnSnO₃ nanocubes to 2D orthorhombic ZnSnO₃ nanosheets with excellent gas sensing performance." *Nanotechnology* 23, no. 41 (2012): 415501.
3. Elzairy, E. M. R., W. A. Abdallah, S. M. Osman, and M. A. M. Fouad. "Recent Approach for Multifunctional Finishing of Cotton/Polyester Fabric Blends via Natural Products." *International Journal of Textile Science* 6, no. 6 (2017): 148-152.

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