

Thermochromic Medical Textiles

Vedran ĐURAŠEVIĆ, Long LIN &
Đurđica PARAC-OSTERMAN

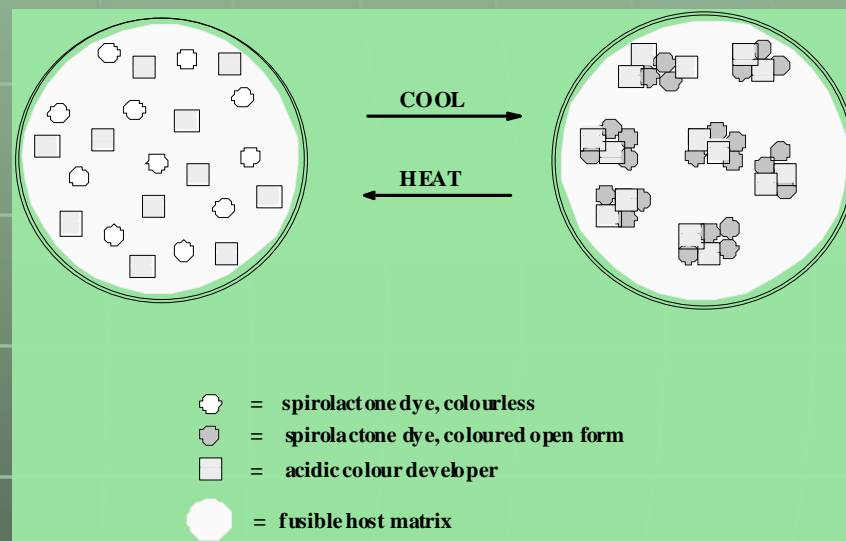
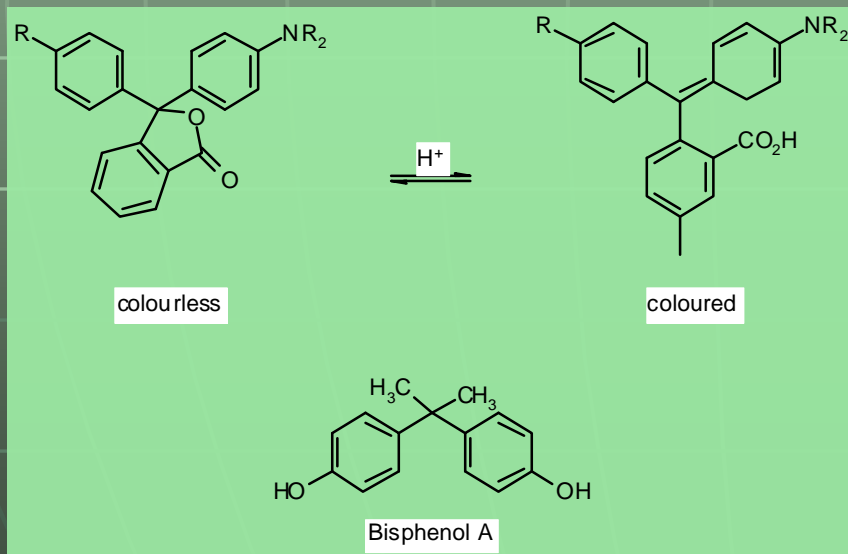


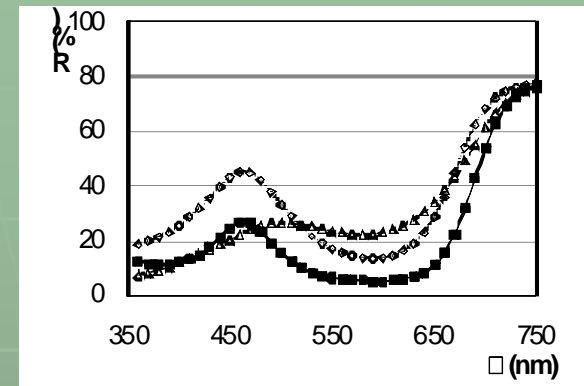
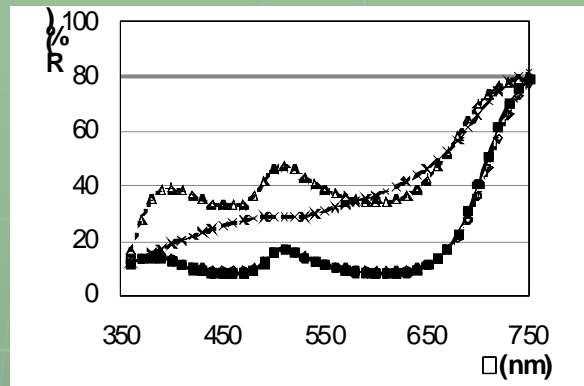
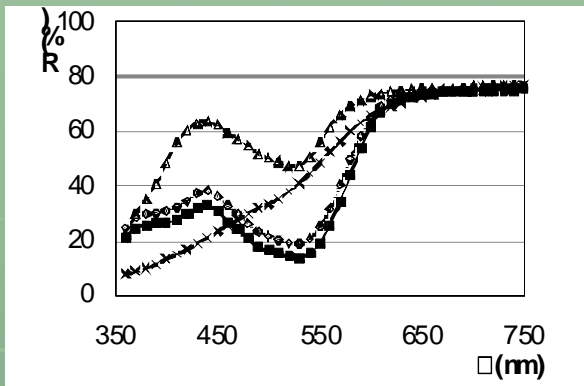
- *smart textile,*
- *healthcare, sensor,*
- *temperature-sensing,*
- *thermochromism,*
- *thermochromic colorants.*

Achieved cooperation

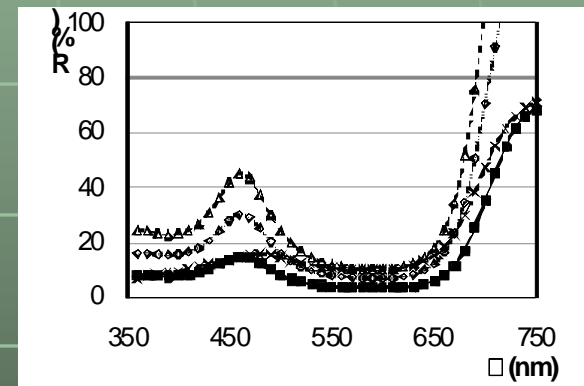
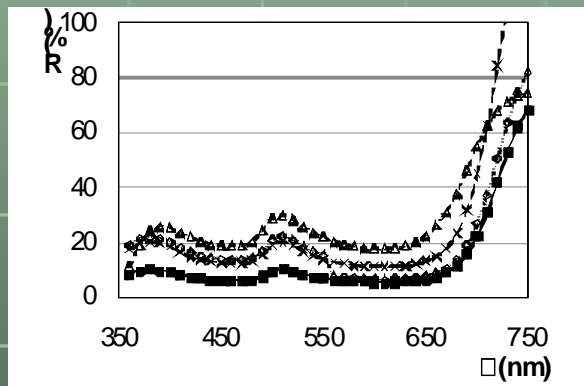
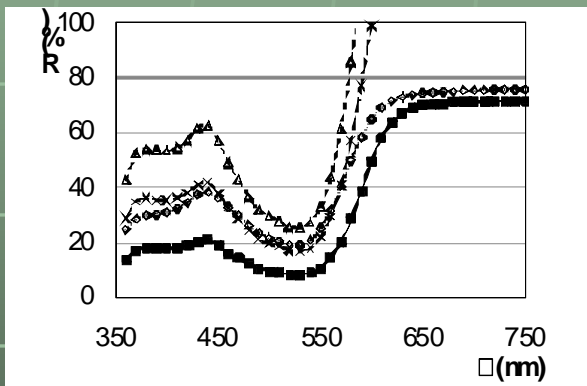
- Colour Science Department,
University of Leeds, Leeds, UK
- Thermographic Measurements Ltd.,
Connah's Quay, UK

Simple mechanism + complex coacervation = thermochromic microcapsules





Reflectance curves of COTTON fabrics printed with the addition of following thermoichromic colorants: a) Chromazone®Red; b) Chromazone®Green; c) Chromazone®Blue



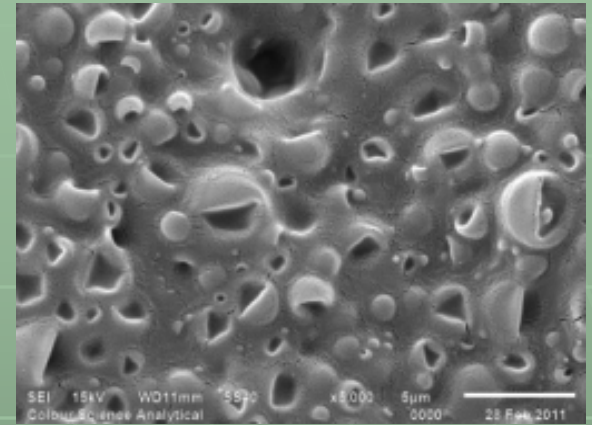
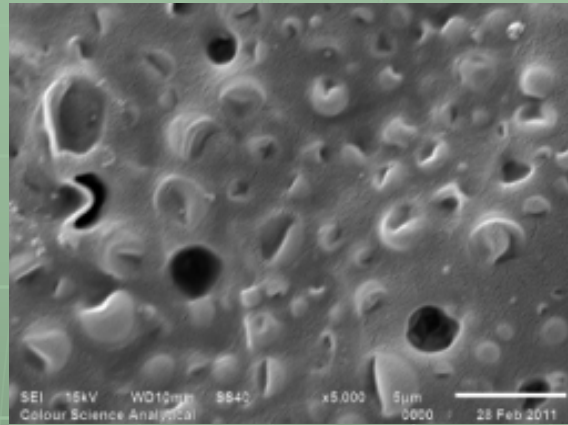
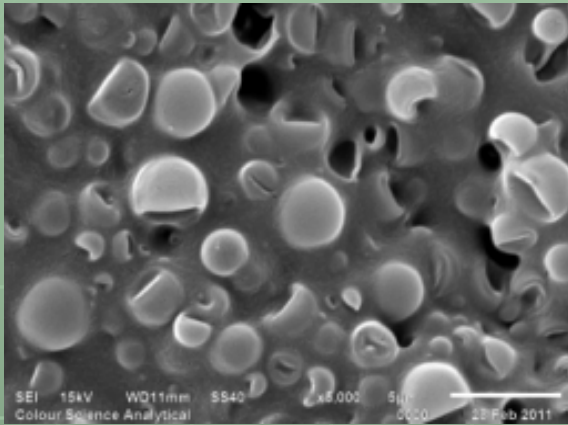
Reflectance curves of POLYESTER fabrics printed with the addition of following thermoichromic colorants: a) Chromazone®Red; b) Chromazone®Green; c) Chromazone®Blue

a.

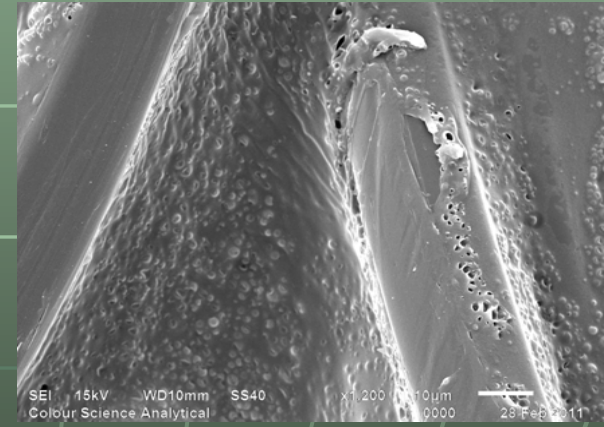
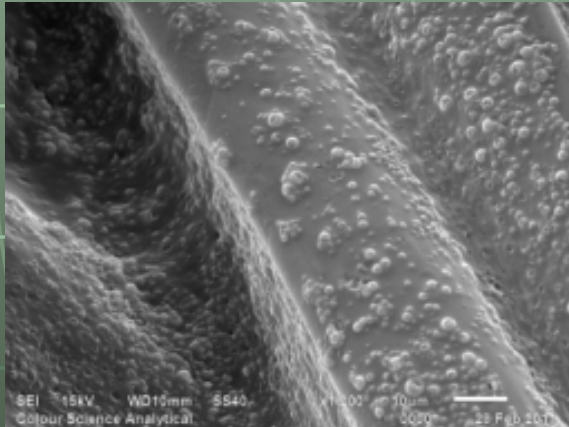
b.

c.





SEM images at 5000x magnification: a) Fabrics printed with Chromazone® thermo-chromic colorant; b) After one washing cycle; c) After light fastness test



SEM images at 1200x magnification: a) PES fabric printed with Chromazone thermo-chromic colorant; b) PES fabric after rub fastness test

Colour – temperature relationship of Chromazone® printed fabrics

Sample	Start of fade (°C)	95% colour loss (°C)	100% colour loss (°C)
Cotton red	28,5	36,7	39,4
Washed	29,7	32,4	36,4
Rubbed	28,1	34,5	37,5
Cotton Blue	31,4	36,9	38,9
Washed	31,4	36,0	37,3
Rubbed	32,4	37,3	39,3
Polyester Red	30,2	37,5	40,0

CONCLUSION

Results obtained in this paper may be considered as guidelines to producing relatively accurate low cost textile temperature sensors.

Investigations have confirmed the potential of microencapsulated thermochromic pigments for use in medical purpose of reacting to a very specific temperature range, usually connected to elevated body temperatures.

Textile fabrics printed with thermochromic pigments reacted to targeted temperatures by decreasing colouration depth in sufficient percentage for the change to be clearly noticeable