

Abstract

Temperature-Sensing Inks for Real-Time Monitoring in Food Packaging [†]

Liliana Leite ^{1,2,*}, Luís Nobre ^{1,2,*}, Inês Boticas ^{1,2}, Miguel Navarro ^{1,2}, João Bessa ^{1,2}, Fernando Cunha ^{1,2}, Pedro Neves ³ and Raúl Fanguero ^{1,2,4}

- ¹ Centre for Textile Science and Technology (2C2T), University of Minho, 4800-058 Guimarães, Portugal; lilianaleite@fibrenamics.com (L.L.); inesboticas@fibrenamics.com (I.B.); miguelnavarro@fibrenamics.com (M.N.); joabessa@fibrenamics.com (J.B.); fernandocunha@fibrenamics.com (F.C.); rfanguero@det.uminho.pt (R.F.)
² Fibrenamics, Institute of Innovation on Fiber-based Materials and Composites, University of Minho, 4800-058 Guimaraes, Portugal
³ José Neves & Cia., Lda., Parque Industrial de Ponte 1ª Fase, Lote F, nº 277 Guimaraes, Portugal; pedro.neves@joseneves.pt
⁴ Department of Mechanical Engineering, University of Minho, 4800-058 Guimaraes, Portugal
* Correspondence: luisnobre@fibrenamics.com
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Temperature is a preponderant factor in the packaging sector. In the food industry, the temperature may change with the environment and it impacts the shelf life and food spoilage [1]. As a result, the temperature to which food has been exposed throughout distribution and storage can be used to evaluate its viability.

This research aimed to develop a user-friendly system capable of monitoring the temperatures to which the packages have been exposed and generating a colorimetric response easily perceptible by the consumer/transporter. Therefore, reversible and irreversible thermochromic inks were stamped onto two different cardboard substrates typically used for packaging. In both samples, by studying the RGB color values and using the CieLab color system, it was concluded that there is a significant color change when the cardboard is subjected to different temperatures, according to the ink threshold (Figure 1). Additionally, the inks showed high abrasion (>100 cycles) and adhesion resistance after stamping.

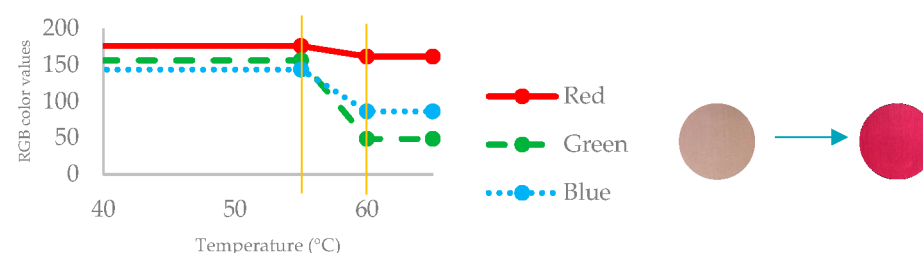


Figure 1. Representative results for RGB color values and color change of cardboard with an irreversible thermochromic ink (threshold of 61 °C).

Thus, the results show great potential for the application of this technology in food monitoring and signaling a possible risk for consumption.

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Reference

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