PRODUCTION OF ANTIBACTERIAL POLYESTER NONWOVEN WITH ZNO/TIO_2 NANOCOMPOSITE: AN INDUSTRIAL CASE STUDY

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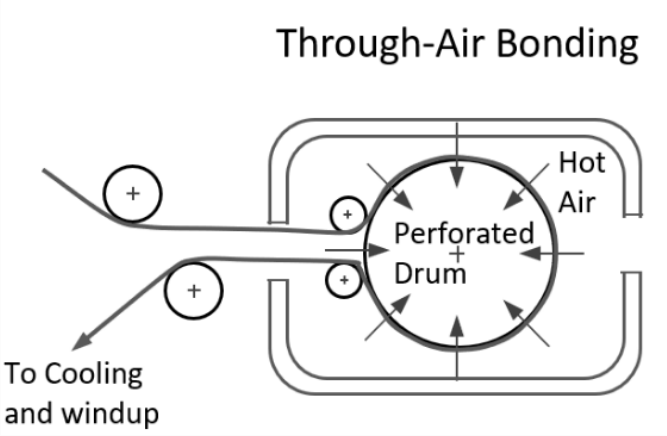
1

INTRODUCTION

Nonwovens

- Thermofused nonwovens
- Production
- Application
- ZnO-TiO2



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MATERIAL AND METHODS

Material

- Thermofused polyester nonwoven (150 g/m^2)

- ZnO- TiO_2 nanocpmposite (500ppm).

Methods

- EDX
- FESEM /SEM
- AFM
- Air permeability
- Antibacterial property
- General quality control

3

RESULTS

$ZnO\text{-}TiO_2$ characteristic

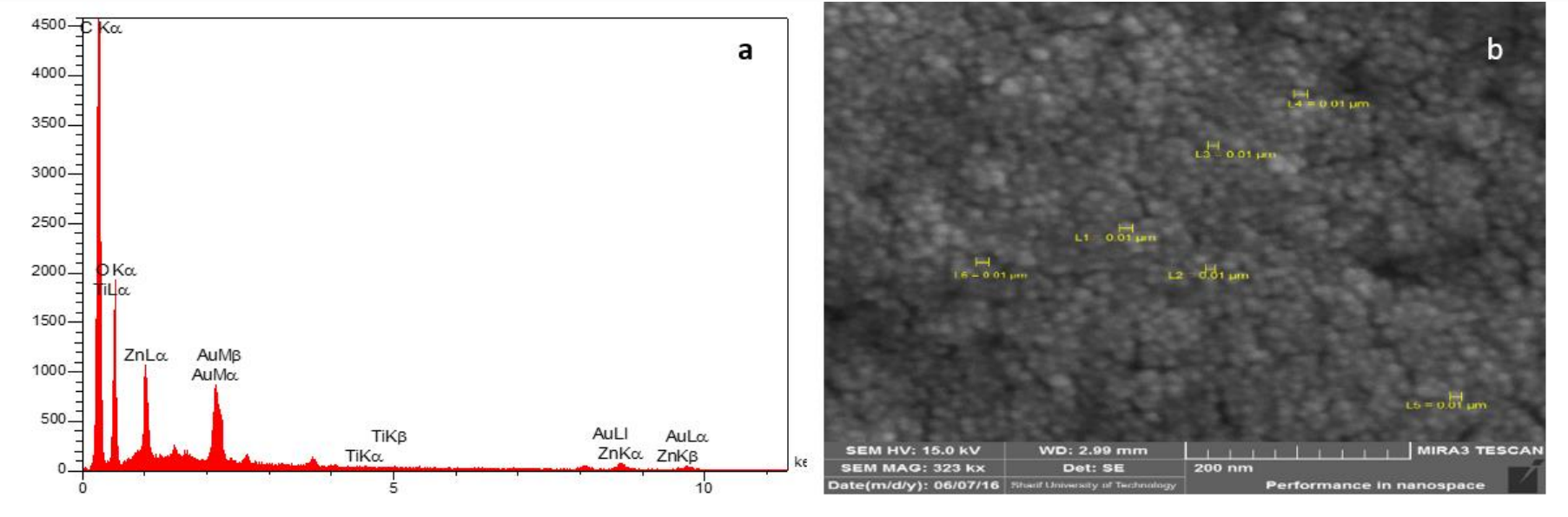

Figure 1: (a) EDX and (b) FESEM of $ZnO\text{-}TiO_2$ nanocomposite

Nonwoven hand feeling and color

- the nanoparticles and finishing ingredients had no adverse effect on the appearance of nonwoven layers.

SEM observation

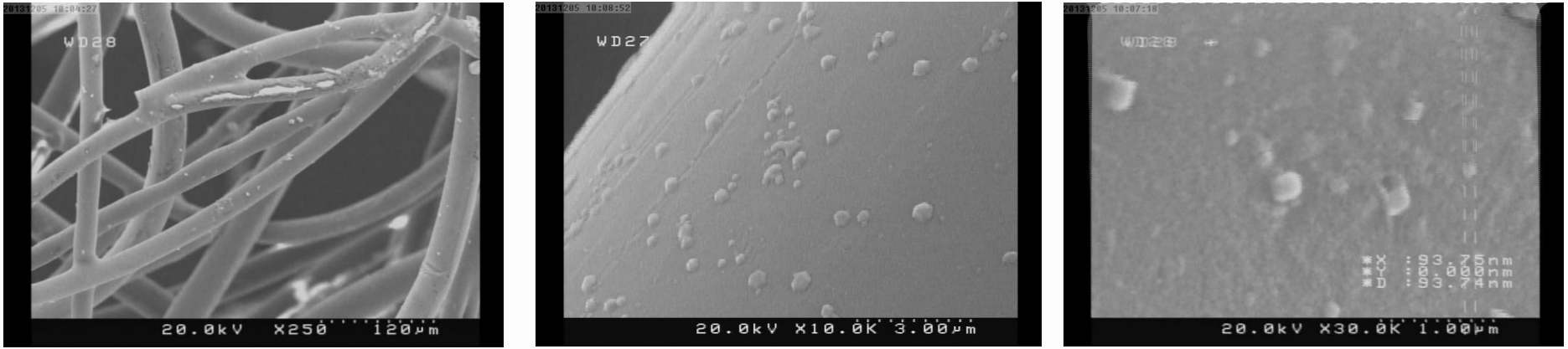

Figure 2: (a) Distribution of ZnO-TiO_2 in layer, (b) the position of the particles on the fiber surface, and (c) the shape and size of nanoparticles

AFM observation

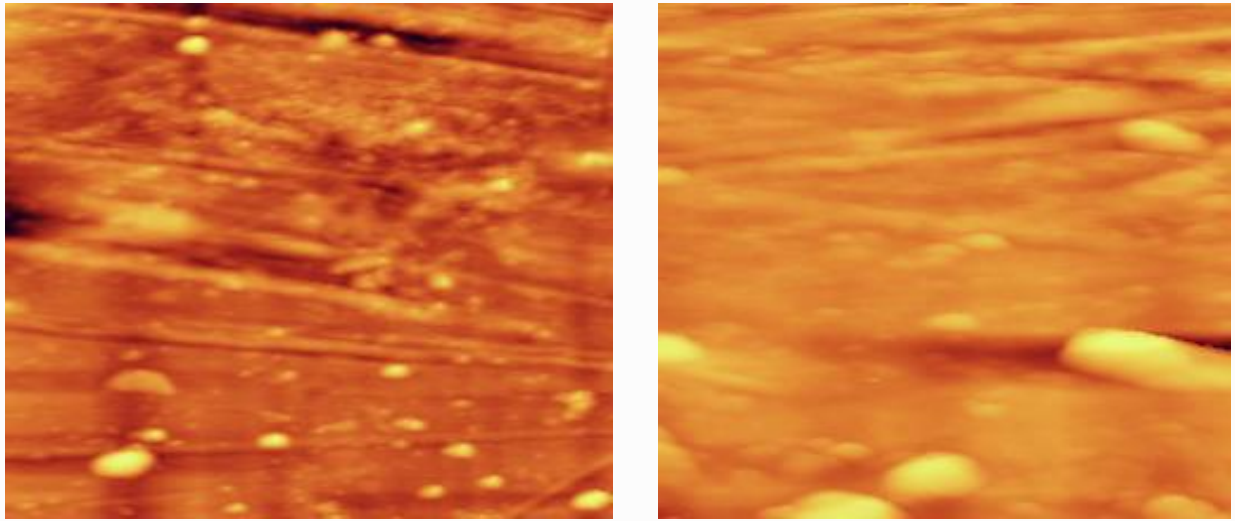

Figure 3: AFM images of treated thermofused polyester nonwoven with ZnO-TiO2

Air permeability

Table 1: Air permeability results of treated and untreated nonwoven with ZnO-TiO2

Sample	*Air Permeability* ($ml\ s^{-1}.cm^{2}$)
Treated nonwoven	58
Untreated nonwoven	58

Antibacterial properties

Table 2: Antibacterial properties of treated and untreated nonwoven with ZnO-TiO2

sample	Antibacterial activity (%)	
	S.aureus	E.coli
Treated nonwoven	96.77	97.18
Untreated nonwoven	-	-

Conclusion

- Good antibacterial effect without affecting the hand feel, color, or scent of the nonwoven layers

Reference

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Thank you very much for your attention