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Composite nonwovens

Dipayan Das, Arun Kumar
Pradhan, R. Chattopadhyay
and S. N. Singh



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Dipayan Chakrabarti^a, Arun Kumar Pradisan^b, R. Chaitan Pradyay^a, and S. N. Singh^a

^aDepartment of Textile Technology, Indian Institute of Technology Delhi, Hauz Khasi, New Delhi, India; ^bDepartment of Applied Mechanics, Indian Institute of Technology Delhi, Hauz Khasi, New Delhi, India

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The term ‘composite nonwovens’ refers to a category of materials different from ‘nonwoven composites’, which consist of a polymeric matrix reinforced by an embedded nonwoven fabric. Many scientists would like to regard ‘composite nonwovens’ as ‘multi nonwoven composites’ and ‘nonwoven composites’ as ‘faced nonwoven composites’. Composite nonwovens are created by combining and innovatively integrating nonwoven technologies to bring together fibres of different origin, different characteristics or a combination thereof. Combination of different nonwoven performs prepared either by employing a variety of process terminologies or by combining nonwoven performs with traditional textile performs into a consolidated structure can also result in the creation of composite nonwovens. Composite nonwovens can provide an engineered solution by creating multifunctional products as well as an economical solution by eliminating manufacturing processes and replacing two or more products by a single product. Business activity in the field of composite nonwovens is therefore expected to grow substantially. In this paper, recent research into composition, parameters, structure–property relationships and applications of composite nonwovens is reviewed beginning with an overview of composite nonwovens encompassing definitions, types, scope and business-related aspects. It then proceeds to discuss the characteristics of both natural and man-made fibres along with some speciality fibres such as bi-component fibres and micro- and nano-fibres in the development of composite nonwovens before exploring manufacturing processes used in creating composite nonwovens. The underlying nonwoven preparation methods and composite processes, such as multi-farming and multi-bonding, together with other more unusual composite processes are described before exploring structure–property relationship in composite nonwovens, including multicomponent nonwovens, multilayered nonwovens, hybrid nonwovens and nonwovens containing particulates or active ingredients. Applications of composite nonwovens in diverse products ranging from wound dressing, surgical gowns, facemasks to absorbent wipes and respirator filters are discussed. Finally, the review highlights the future prospects for composite nonwoven materials.

Keywords: composite; fibres; process; structure; nonwoven

1. Introduction

1.1. Definition of composites

The word ‘composite’ means made up of various parts; some are natural materials, such as wood or bamboo, whereas others are created by combining different natural or man-made

Corresponding author. Email: Dipayan@textile.iitd.ac.in