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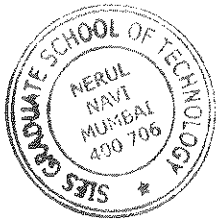

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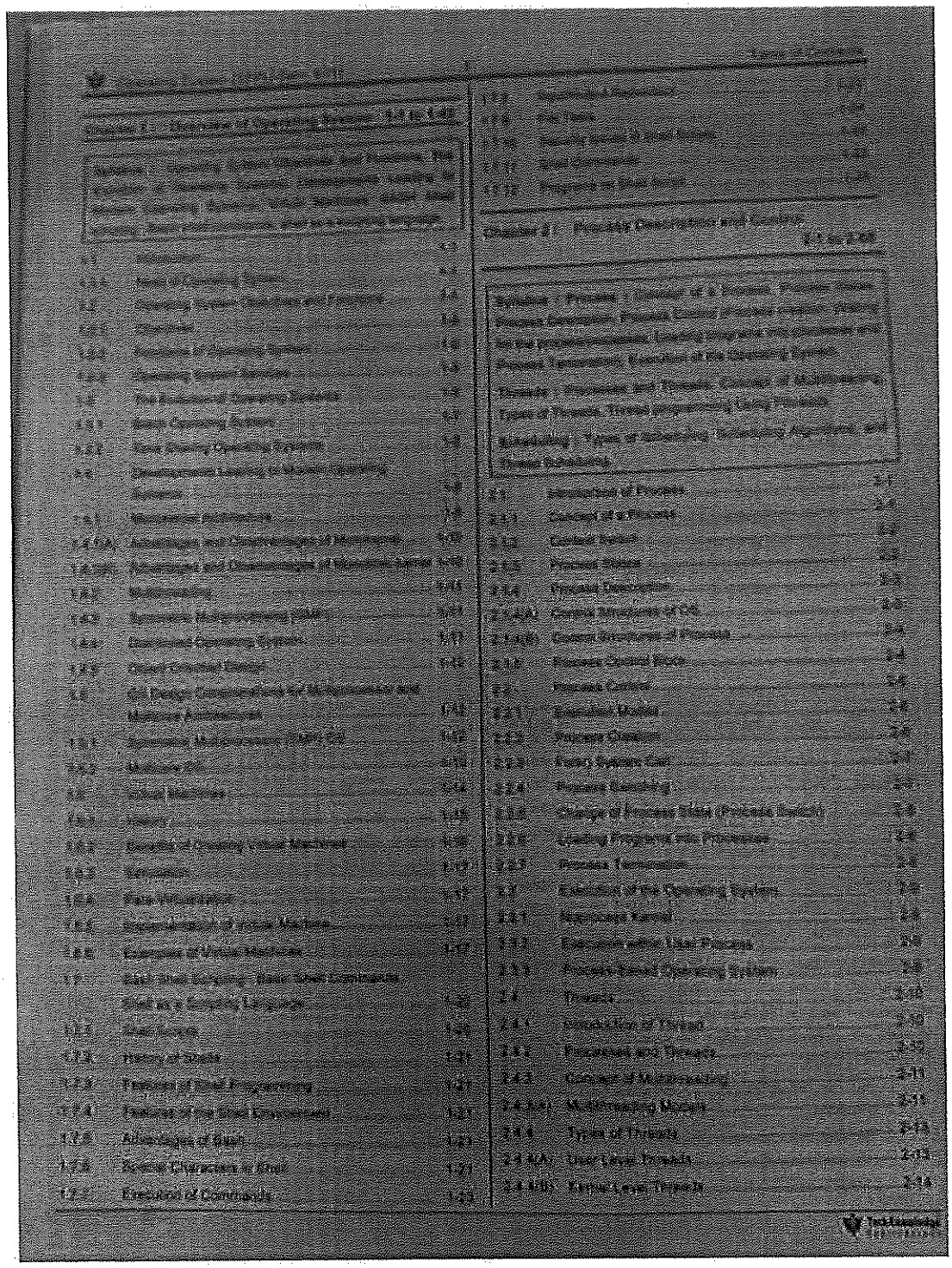

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Classical synchronization problems : Readers/Writers Problem, Producer and Consumer problem, Interprocess communication (Pipes, shared memory : system V).

Deadlock : Principles of Deadlock, Deadlock Modeling, Strategies to deal with deadlock : The Ostrich Algorithm, Deadlock Prevention, Deadlock Avoidance, Deadlock detection and recovery, An Integrated Deadlock Strategy, Example : Dining Philosophers Problem.

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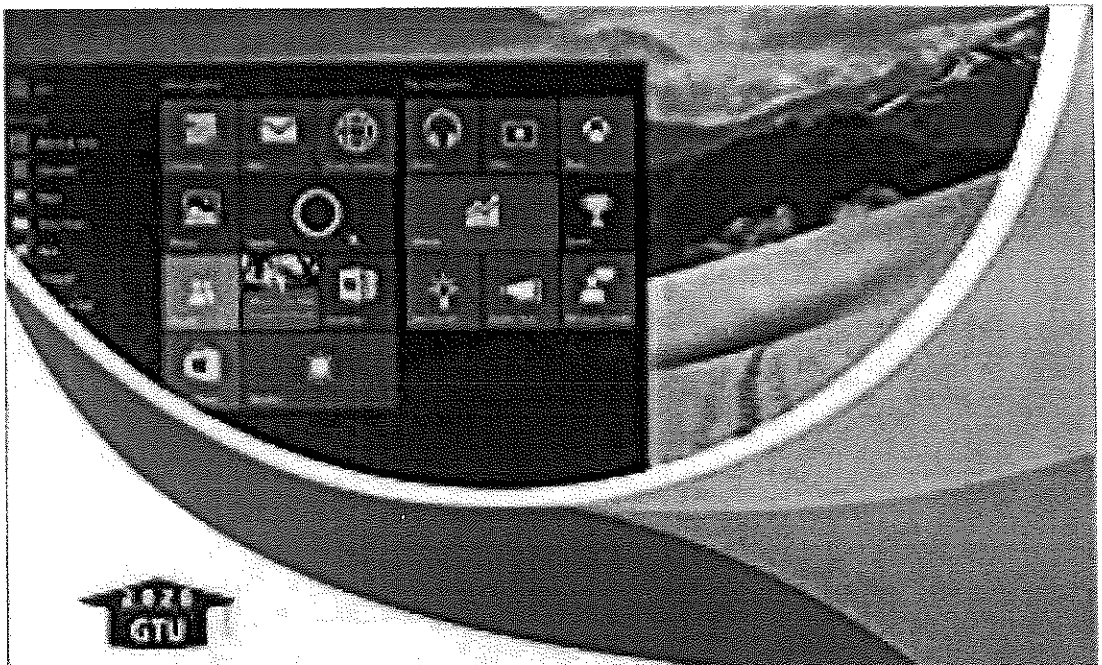

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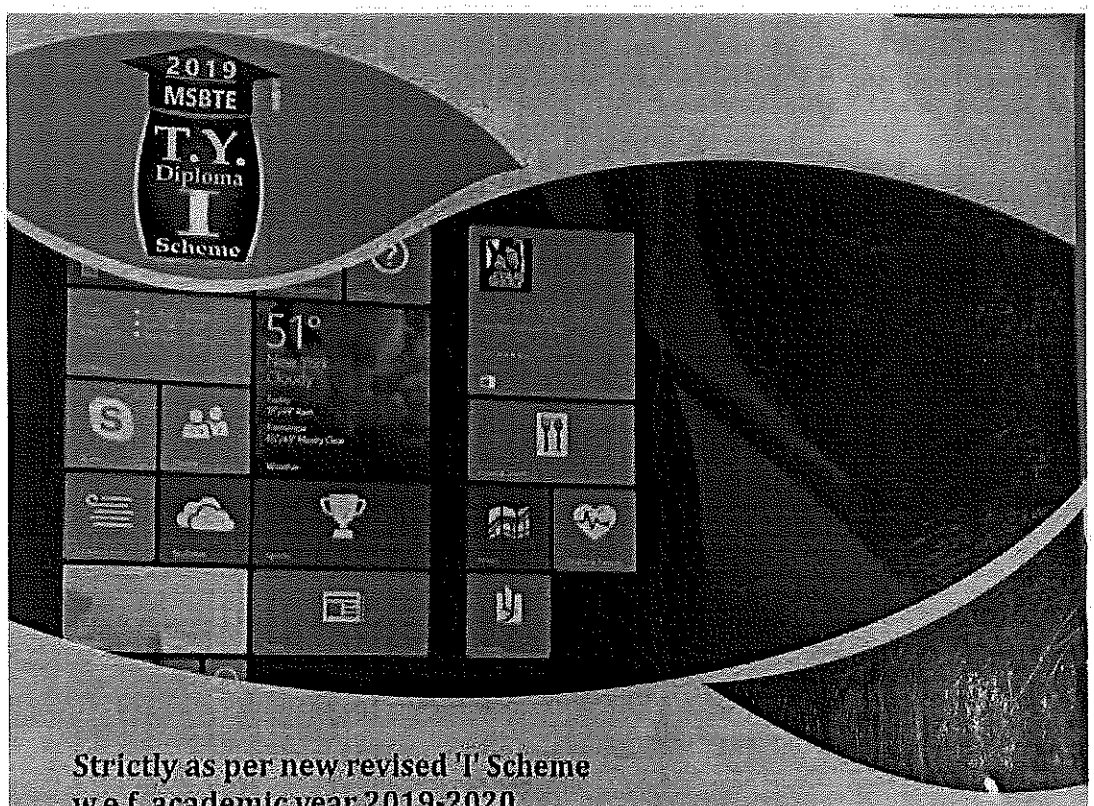

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UNIT I

Chapter 1 : Overview of Operating System 1-1 to 1-38

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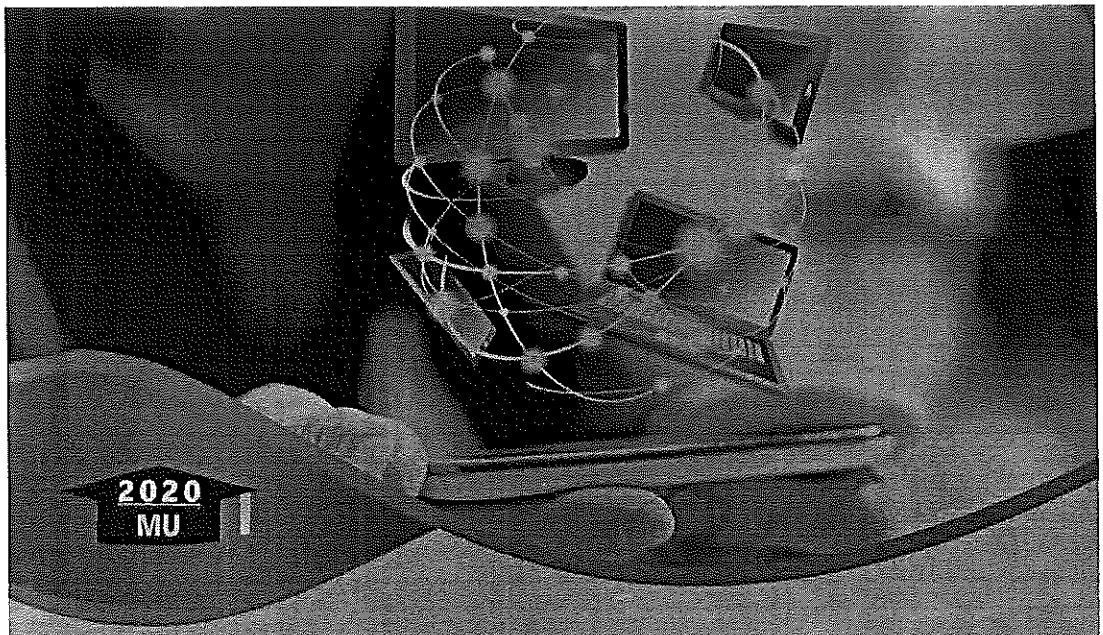

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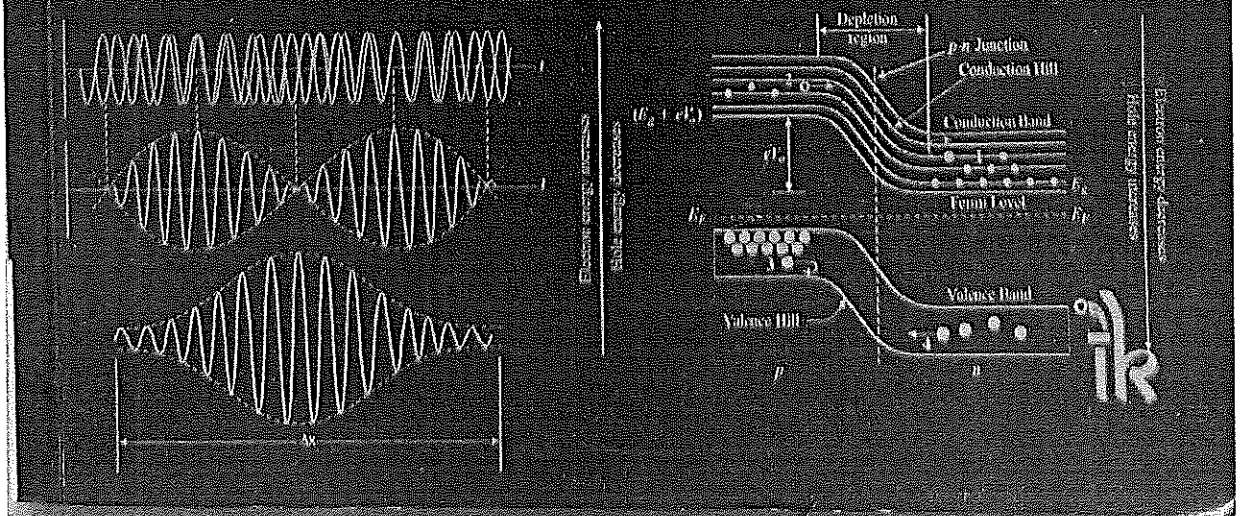

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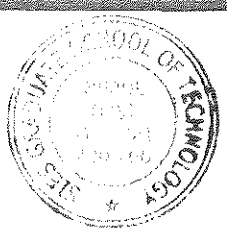

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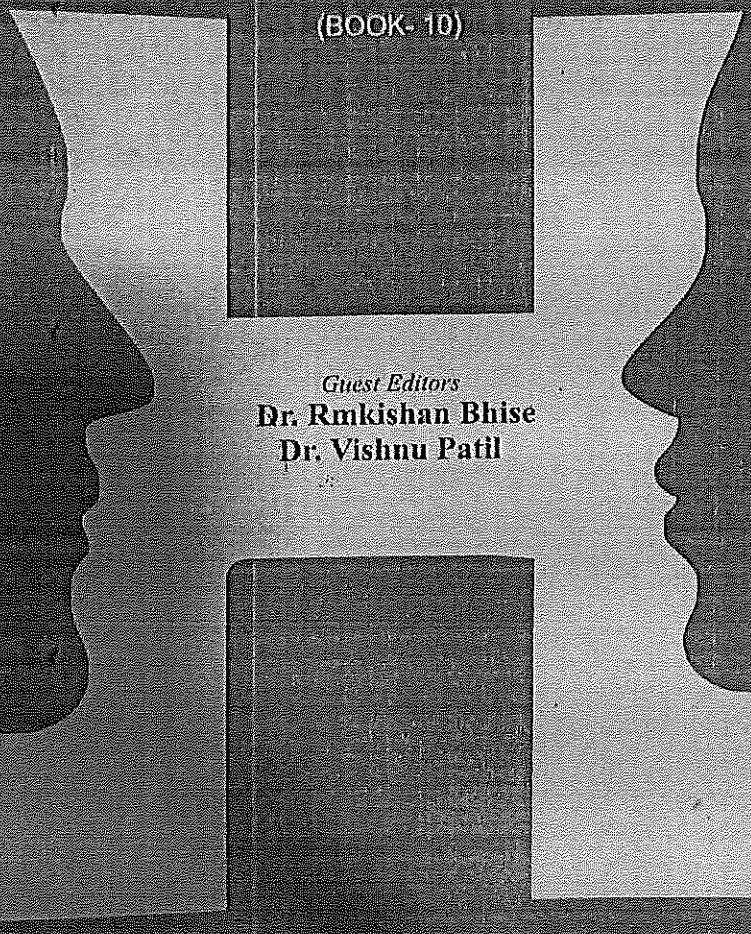

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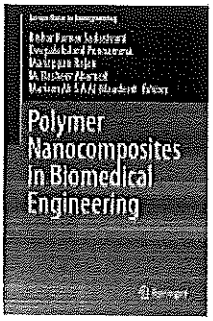

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Engineering - Biomedical Engineering and Bioengineering

Tadhmeen K.C., Pasquinelli G., Kaya M., Ahmed E., Abdelaziz M.A.S.A. (Eds.)

Polymer Nanocomposites in Biomedical Engineering

- Discusses the influence of preparation techniques on the generation of micro-, meso- and nanostructure fibers and the effect of fiber size and dispersion
- Presents a thorough discussion of the physics, biology, chemistry and medicinal science behind polymer nanocomposites
- Discusses recent research on polymer nanocomposites in Biomedical Engineering
- Presents a fundamental approach towards polymers and polymer composites

This book presents a thorough discussion of the physics, biology, chemistry and medicinal science behind a new and important area of materials science and engineering: polymer nanocomposites. The tremendous opportunities of polymer nanocomposites in the biomedical field arise from their multitude of applications and their ability to satisfy the vastly different functional requirements for each of these applications. In the biomedical field, a polymer nanocomposite system must meet certain design and functional criteria, including biocompatibility, biodegradability, mechanical properties, and, in some cases, aesthetic demands. The content of this book builds on what has been learnt in elementary courses about synthesizing polymers, different nanoparticles, polymer composites, biomedical requirements, uses of polymer nanocomposites in medicine as well as medical devices and the major mechanisms involved during each application. The impact of hybrid nanofibers and synergistic composite mixtures which are used extensively or show promising outcomes in the biomedical field are also discussed. These novel materials vary from inorganic/ceramic-reinforced nanocomposites for mechanical property improvement to peptide-based nanomaterials, with the chemistry designed to render the entire material biocompatible.

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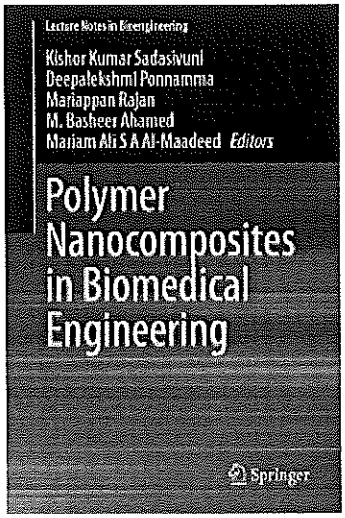

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Engineering : Biomedical Engineering and Bioengineering

Sadasivuni, K.K., Ponnamma, D., Rajan, M., Ahmed, B., Al-Maadeed, M.A.S.A. (Eds.)

Polymer Nanocomposites in Biomedical Engineering

- Discusses the influence of preparation techniques on the generation of micro-, meso- and nanoscale filters and the effect of filler size and dispersion
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Silver Nanoparticles and Its Polymer Nanocomposites—Synthesis, Optimization, Biomedical Usage, and Its Various Applications

Kishor Kumar Sadasivuni, Sunita Rattan, Sadiya Waseem, Snehal Kargirwar Brahme, Subhash B. Kondawar, S. Ghosh, A. P. Das, Pritam Kisore Chakraborty, Jaideep Adhikari, Prosenjit Saha and Payal Mazumdar

Abstract Nanomaterials have emerged as an extremely valuable asset in the world of material science. It's unique, and substantial properties lurk scientist all over the world into incorporating them in various material synthesis. Composites are yet another powerful tool for the development of specific material according to our needs. Fusion of the above-mentioned two mighty tools results in birth of a whole

The original version of this chapter was revised: Related corrections have been incorporated. The correction to this chapter is available at https://doi.org/10.1007/978-3-030-04741-2_13

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new domain called nanocomposites. This unit provides details about different aspects of nanomaterials, composites, and their categories. This chapter talks thoroughly about the basics behind the various synthesis process involved along with optimization of various parameters related to fabrication of such nanocomposites. Among the pool of nanocomposites, silver nanoparticles and the composites based on these particles have harnessed much attention because of the striking properties of Ag nanoparticles like high electrical and thermal conductivity, chemical stability, catalytic activities, antimicrobial properties, nonlinear optical behavior, and surface-enhanced Raman scattering. Synthesis and development of AgNPs in the literature have been mentioned, and techniques have been reviewed. Detailed discussions based on each individual property have also been carried out along with exploring the applications in numerous varied fields.

Keywords Nanomaterials · Composites · Nanocomposites · Ag nanoparticles · Biomedical · Applications

1 Introduction

A "composite material" is defined as a mixture made up of materials having strikingly different physical and chemical properties on the macroscopic levels (Fadiran et al. 2018). The resultant material usually possesses properties different from those of any of their constituents. By using composites, it is possible to have properties like high strength and stiffness at high temperature, corrosion resistance, ability to withstand extreme temperature conditions, and desirable thermal expansion coefficient. Composite materials comprise of two phases: the matrix which is generally the continuous phase and the other phase(s) embedded in this matrix is known as the "reinforcement." A variety of unique combinations of these matrices (e.g., polymers, carbon, metals, and ceramics) and reinforcements (e.g., particles, fibers, and layered materials) have been employed for the synthesis of various composite and nanocomposite materials.

Quite recently, nanocomposites have garnered a lot of attention since they are nearly 1000 times tougher than their bulk counterparts. Sincere steps have been taken, and lots of work is still undertaken towards creation of controlled nanostructures using novel and innovative techniques. The field of synthesis and characterization of nanocomposites of both organic and inorganic materials is a rapidly growing area of research. The characteristic properties of nanocomposites materials synthesized depend mainly on the features of the fundamental material from where it is originating. In terms of physical properties, nanocomposites and conventional composite materials differ a lot in terms of surface area, where

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