BIOCHEMISTRY RESEARCH TRENDS

HANDBOOK OF RESEARCH ON NANOMATERIALS, NANOCHEMISTRY AND SMART MATERIALS

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Editors

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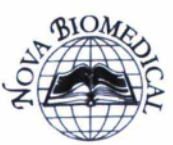

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Preface

The collection of topics in this book aims to reflect the diversity of recent advances in nanomaterials, nanochemistry and smart materials with a broad perspective that may be useful for scientists as well as for graduate students and engineers. The book offers scope for academics, researchers, and engineering professionals to present their research and development works that have potential for applications in several disciplines of engineering and science. Contributions range from new methods to novel applications of existing methods to gain understanding of the material and/or structural behavior of new and advanced systems. This book presents leading-edge research from around the world in these dynamic fields.

Chapter I - Clothing is a person's second skin, since it covers great parts of the body and has a large surface area in contact with the environment. Therefore, clothing is proper interface between environment and human body and could act as an ideal tool to enhance personal protection. Over the years, growing concern regarding health and safety of persons in various sectors, such as industries, hospitals, research institutions, battlefields and other hazardous conditions, has led to intensive research and development in field of personal protective clothing. Nowadays, there are different types of protective clothing. The simplest and most preliminary of this equipment is made from rubber or plastic that is completely impervious to hazardous substances, air and water vapor. Another approach to protective clothing is laminating activated carbon into multilayer fabric in order to absorb toxic vapors from environment and prevent penetration to the skin. The use of activated carbon is considered only a short-term solution because it loses its effectiveness upon exposure to sweat and moisture. The use of semi-permeable membranes as a constituent of the protective material is another approach. In this way, reactive chemical decontaminants encapsulates in microparticles or fills in microporous hollow fibers. The microparticle or fiber walls are permeable to toxic vapors but impermeable to decontaminants, so that the toxic agents diffuse selectively into them and neutralize. All of these equipments could trap such toxic pollutions but usually are impervious to air and water vapor and thus retain body heat. In other words, a negative relationship always exists between thermal comfort and protection performance for currently available protective clothing. For example, nonwoven fabrics with high air permeability exhibit low barrier performance, whereas microporous materials, laminated fabrics and tightly constructed wovens offer higher level of protection but lower air permeability. Thus there still exists a very real demand for improved protective clothing that can offer acceptable levels of impermeability to highly toxic pollutions of low molecular.