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ENERGY SUPPLY INFRASTRUCTURE OF SMART TRANSPORT

*Innovative Energy Supply Technologies for Smart
Transport and Electric Transport Infrastructure*

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The book examines innovative infrastructure components of smart homes and smart transport systems with a focus on efficiently solving energy supply challenges and applying the most advanced integrative solutions based on the use of next-generation composite materials. The concept of smart homes and smart transport was originally based on the use of solar energy to meet all energy demands of their infrastructure components. These solutions were demonstrated at international exhibitions dedicated to solar energy and were largely associated with the use of solar-powered devices for charging electric vehicle batteries.

Already at the initial stages of demonstration, it became evident that both smart homes and smart transport systems require energy storage systems—specifically accumulators and batteries—to ensure a stable electricity supply during periods of low energy consumption. Early experiments involving the use of automotive batteries for these purposes clearly revealed a critical dependency of storage systems on thermal conditions. This led to the need for developing effective solutions through the application of new structural materials for the production of enclosures and components of energy storage systems intended for operation within the infrastructure supersystems and subsystems of smart homes, with the possibility of further application in electric vehicles.

Keywords: *Smart transport ecosystem; smart transport infrastructure; accumulators and batteries; composite material simultaneously serving as an electrical conductor and an efficient thermal conductor; three-dimensional composite pseudo-porous structure; ultra-high thermal conductivity, ultra-high electrical conductivity pseudo-porous three-dimensional composite structure*

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INTRODUCTION

Infrastructure and ecosystem of smart homes and smart transport systems, including smart electric transport and smart mobile homes.

This book examines innovative infrastructure components of smart homes and smart transport systems, focusing on efficient solutions for energy supply challenges and the application of advanced integrative technologies based on cutting-edge composite materials.

The concept of smart homes and smart transport systems was initially based on the use of solar energy to meet all energy demands of infrastructure components. These solutions were demonstrated at global exhibitions dedicated to solar energy and were largely associated with solar-powered technologies for charging electric vehicle batteries.

From the earliest demonstrations, it was established that ensuring a stable electricity supply in smart homes and smart transport systems requires the use of accumulators and batteries for energy storage during periods of minimal consumption.

Initial experiments using automotive batteries for these purposes clearly demonstrated the strong dependence of storage systems on temperature conditions, which necessitated the development of effective solutions through the use of new structural materials for manufacturing housing components of energy storage systems intended for operation within infrastructure supersystems and subsystems of smart homes, with potential subsequent application in electric vehicles.