

Strategic Design of Hierarchical Nanostructures for Enhanced Physicochemical Properties of Materials

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With the aid of recently developed nano-processing methods, variously shaped hierarchical structures have been developed. In this study, we propose a strategic means to obtain the enhanced physicochemical properties of materials via harnessing the hierarchical structures, wherein the polymeric matrix is complexed with inorganic, organic, or biological species in an elaborate manner. Resulting hierarchical structures provide several advantages, such as maximized surface area, outstanding mechanical stability, and processing robustness. Finally, as an representative example of practical utilizations, we present applications in the area of superhydrophobic surface coating, high capacity energy devices, and high performance nanofiltration membranes, and so on.