

Preface

The progress of today's science and technology encounters an increasing demand for finer and more efficiently performing materials with properties superior to those of current and hence ageing devices. Whether this concerns electronics or drug delivery, cancer diagnostics or alternative energy sources the search for means of miniaturising the existing materials or devising fundamentally new components with higher capacities appears to be relentless.

A saving solution to this is widely proposed as the design and fabrication of nanostructures, molecular architectures with dimensions featured below 100 nm.

By convention, and as originally formulated by Richard Feynman, the challenge of constructing macroscopic structures through the manipulation of individual molecules or even atoms prompted the emergence of a rapidly evolving field – nanotechnology. By definition, nanotechnology mirrors complex organisation at the nanoscale and is underpinned by a variety of related physical events that are combined into one universal process – molecular self-assembly.

The phenomenon of self-assembling molecules is attractive from both academic and application perspectives. However, preferential attention is being given to approaches whereby nanostructured materials or their components can be produced, moreover, produced at whim; that is, designed.

The pursuit for routes that can lead to rational or at least predictable design strategies invoked the main objective of this publication – to bring together contemporary approaches for designing nanostructures that employ naturally derived self-assembling motifs as synthetic platforms.

Entitled *bioinspired nanoscale design* or *bionanodesign* the book is written in the shape of a review, referenced as fully as permissible within the context of biomolecular recognition and self-assembly, which forms a general trend throughout.

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Bionanodesign

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The volume is composed of three core chapters focusing on three prominent topics of applied nanotechnology where the role of nanodesign is predominant. Specific applications that arise from designed nanoscale assemblies as well as fabrication and characterisation techniques are of a much lesser focus and whenever they appear serve as progress and innovation highlights.

In this sense, the book takes a nonstandard approach in delivering the material of this kind. It does not lead straight to applications or methods as most nanotechnology titles tend to do, but instead it admits the initial and primary stress on “nano” rather than on “technology”. The task is significantly eased by the cohort of brilliant bioinspired designs reported to date and complicated by the volume they create almost on a weekly basis. For this reason, the author apologises for the inevitable, but not necessarily deliberate, omission of examples, many of which may prove to be equally if not more influential in bionanodesign.

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