

## Preface

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Molecular machines add an independent domain to science and technology to execute properties related to conventional machines at a molecular level in an integrated manner. Miniaturization of a conventional machine and construction of molecular machine have common points in terms of working with small size but each case has an independent approach and methodology. Many molecular machines are inspired by nature so as to replicate biological functions. Biological molecular machines operate with moving parts that are in nano-dimension and are driven by fuel generated through concerted catalytic reactions. Such process may involve various mechanisms and may be made functional by external stimuli or in-built stimuli. For instance, fundamental aspects realised from Adenosine triphosphate (ATP) synthase molecular machine for synthesise of ATP from ADP in living systems suggests that understanding of molecular level would keep open facts related to activities of living beings as a machine does. Fabrication of functional models is expected to enhance performance of new molecular machines that would be evolving with time. Biological molecular machines being too small, their operational aspects are observed under high resolution microscope but action can be visualised by a microscope attaching micron size attachments. Studying various aspects of physical principles associated in construction and operation of such machines helps to look forward feasibility of new design of molecular machines. Coming days are going to see boom on advent of high performance tools to study microscopic world. This would

enable one to have handles to deal with molecular machines at ease. An ambient situation for operation and new ideas for new functional properties from molecular machines will emerge. This book is written with an objective to provide such an impetus to deal with fundamental aspects of molecular machines.