

## **PREFACE**

The Government of India formally established the Atomic Energy Commission on 10th August 1948 under the inspiring leadership of Dr. Homi Jehangir Bhabha, the father of the Indian Nuclear Energy Program. Considering the importance of Chemical Sciences in Atomic Energy, Dr. Bhabha initiated the 'Chemistry Programme' in the department in 1949 itself, with appointment of Dr. Jagdish Shankar as the first Chemist in DAE. In order to mark the 75 glorious years of the Chemistry fraternity, it is vital to recollect the contributions made by our predecessors and re-dedicate ourselves with greater commitments to serve the nation. This collection is an attempt in that direction. On this occasion, this compendium encompassing some of the major legacy activities undertaken by Chemistry Group, BARC colleagues has been published.

Some of the pioneering work in Chemistry Group includes analysis of uranium/thorium ores (during 1950s), methods development for separation of Zr and Hf (1955), high specific activity cobalt production (1955), activity removal of primary heat transport system in CIRUS (1960), fission gas release studies, development of indigenous facility for high purity materials, cover gas analyzer development, cleaning of heavy water in Dhruva (1986), devices and materials for nuclear safety, chemistry of materials for the nuclear fuel cycle, etc. In this collection, an account of some of the major areas in which Chemistry has contributed is presented under different thematic areas. The book begins with a historical perspective on the evolution of Chemistry Programme at DAE followed by articles on analytical chemistry programme, high purity materials development, radiation chemistry research, reactor water chemistry, chemistry of nuclear materials, solid state chemistry research etc. Articles on chemical dynamics, catalysis research, gas chromatograph development, healthcare materials, electrochemistry research, polymer chemistry, theoretical chemistry research, net-zero emission etc. are also included. Most of the articles are structured in a manner that provides a historical perspective of the respective activities, followed by the current research and future directions. We hope that this compendium will serve as a handy guide to reminisce the activities of the group and will be a useful archive for the future generations.

We would like to express our sincere gratitude to Dr. A. K. Mohanty, Chairman, AEC and Secretary, DAE and Shri Vivek Bhasin, Director, BARC for their constant encouragement and support in bringing out this collection. We greatly appreciate the efforts of all authors for timely submission of the articles and incorporation of relevant information since the inception of the research activity under the specific theme. Thanks are also due to Dr. S. Adhikari, Associate Director, Knowledge Management Group, Shri Manoj Singh, Head, SIRI and his colleagues, in particular, Shri Sanjay Singh, Smt. Leena Kanal and Shri Bhushan Chavan for their painstaking efforts in publishing this book within a short time. Dr. Manoj Kumbhakar is thanked for designing the cover page art work. We sincerely acknowledge the help received from all Technical and Publication Committee members.

All efforts have been made to make it as error-free as possible. However, we will be thankful to our readers if they bring to our notice any inadvertent errors that might have crept in while preparing/editing this book.

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