

Preface

For those working in the field of combustion and explosion, Academician Yakov Borisovich Zel'dovich is a distinctive personality — eminent scientist with all-embracing research interests, one of the famous founders of the combustion and detonation theory. His contribution to the field is enormous and invaluable, his ideas and approaches became masterpieces of the Science. Apart from combustion, his major contributions to nuclear and elementary particle physics, theory of gravitation and cosmology, astrophysics and X-ray astronomy, catalysis, biology, and mathematics are also well-known.

Physical essence was always the priority to the mathematical accuracy for Ya.B. (this was how his disciples used to call him). The principal point for him was the qualitative general pattern of the process rather than absolute values of the governing parameters. Ya.B. was a person with quick mind. In conversation, he always ran ahead of the partner. Ya.B. was fond of prose and poetry and traced all the new novels and verses. When journalists attacked him with questions about his personal life, he answered by Mayakovskii's words "I am a poet, that's why I am attractive."

Ten years ago, in 1994, the Scientific Council on Combustion and Explosion of the Russian Academy of Sciences organized the International Conference on Combustion dedicated to the 80th anniversary of Yakov Borisovich Zel'dovich's birth, referred to as the Zel'dovich Memorial. The conference was held in Moscow suburb Voronovo and received the overwhelming response of the scientific community: more than 300 participants from more than 20 nations with more than 200 presentations on all aspects of the combustion science. The Proceedings of the Zel'dovich Memorial'1994 were published in two volumes* and spread worldwide. American Institute of Astronautics and Aeronautics has published selected papers presented at the Conference in a separate volume.†

*Merzhanov, A. G., and S.M. Frolov, eds. 1995. *Combustion, detonation, shock waves. Proceedings of the Zel'dovich Memorial 1*; Frolov, S.M., ed. 1994. *Combustion, detonation, shock waves. Proceedings of the Zel'dovich Memorial 2*.

†Sirignano, W. A., A. G. Merzhanov, and L. De Luca, eds. 1997. *Advances in combustion science: In honor of Ya. B. Zel'dovich*. Progress in astronautics and aeronautics ser. Reston, VA: AIAA Inc. 173.

In 2004 Yakov Borisovich would have turned 90. Since his death in 1987, much research and development activities have taken place in the field of combustion and explosion and are still continuing. Therefore the Scientific Council on Combustion and Explosion of the Russian Academy of Sciences put forward the idea of organizing in Moscow the International Conference on Combustion and Detonation dedicated to the 90th birthday anniversary of Ya.B. Zel'dovich — the Zel'dovich Memorial'2004.

The Technical program of the Zel'dovich Memorial'2004 involved 80 invited lectures and more than 120 poster presentations. This book contains more than 200 revised, edited, and formatted abstracts of papers written by international experts in combustion, detonation, and explosion science. The book provides a quick overview of the state-of-the-art in these disciplines. The contributions are presented in six parts:

- (1) Combustion of Gases
- (2) Combustion of Solids and Energetic Materials
- (3) Heterogeneous Combustion
- (4) Fire and Explosion Safety and Technological Combustion
- (5) Detonations
- (6) Hydrodynamic Phenomena and Extreme States of the Matter.

The contents of the book include recent worldwide accomplishments in fundamental and applied studies on combustion and detonations of gases, solids, sprays, and hybrid reactive media, as well as various hydrodynamic phenomena at extreme states of the matter — topics of classical works by Yakov Borisovich Zel'dovich.

The Conference and this volume are the outcome of hard work of many people and we appreciate their contribution. We acknowledge the assistance given by Ms. Olga Frolova and thank the staff of Torus Press, Ltd. for producing the volume. Special thanks are due to the Organizing Committee (chaired by A. G. Merzhanov), the Program Committee (chaired by N. I. Kidin), and the International Advisory Board (chaired by F. A. Williams) of the Conference for their effort in elaborating the

exciting technical program of the meeting. We acknowledge the members of the Trusteeship Committee (chaired by N. A. Plate) and thank the sponsoring organizations — Institute of Structural Macrokinetics and Material Science of the Russian Academy of Sciences, N.N. Semenov Institute of Chemical Physics of the Russian Academy of Sciences, and Russian Foundation for Basic Research — whose financial support was decisive for publishing this book.

We dedicate this book to the kind memory of Yakov Borisovich Zel'dovich. We do hope this volume will serve as valuable addition to the literature on combustion and detonation.

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