

FOREWORD

Atmospheric pollution caused by the uncontrolled development of industrial technologies, has as of now reached the danger point, past which its irreversible effect on natural factors and the resulting danger to living organisms and to future human generations starts outweighing the advantages of technological progress. Any technology must now be ecology friendly, employ waste-free production arrangements and include effective and reliable elements and means of environmental protection. The increase in the demand for such means and the need to perfect them, brought about by the appearance and development of increasingly more ecology-damaging industries such as nuclear power generation, modern chemistry and biotechnologies, have resulted, in their turn, in the appearance of the so-called ecology-protection technologies that are capable not only of accomplishing the direct function of protecting the environment, but also of performing the opposite function of protecting a large number of new technologies such as space-exploration, information, medical, obtaining particularly pure materials, medicines and food products from the harmful effects of the environment.

Given the total nature of the danger of environmental pollution, the assessment of potential means, the optimal selection of environmental protection technologies and monitoring their effectiveness lies outside the competence of those who design and operate polluting industries and becomes increasingly more the prerogative of special expert and monitoring services. This, in its turn, requires the availability of competent knowledge of the substance and capabilities of environ-

mental-protection technologies by experts working in the field of environmental protection, i.e., ecologists, hygienists, managers, experts and monitoring personnel.

High-efficiency gas purification by Petryanov filters is one such universally acknowledged aerosol-removal technology. These filters are made of fibrous materials obtained by means of electrospinning. The substance and capabilities of this method, the use of the fibrous materials produced by it, the various and unique separating properties embodied in it, are described in two monographs recently published in Russia [1, 2]. These books correlate the extensive scientific and applied information accumulated over 70 years of activity of the Aerosols Laboratory of the L.Ya. Karpov Institute for the purpose of creating a systematic approach to the problem under study, including theoretical principles of electrospinning of fibrous materials and establishing a theoretical basis for high-efficiency removal of aerosols from gases using these materials. These monographs also correlate the practical experience of the filtration method for deep purification of air and other gases by removal of aerosols for the purpose of protecting the environment, the health of industrial personnel and of the population at large and also for ensuring purity and sterility of industrial gases, atmospheres of working zones and premises adjoining them in a number of new high-tech industries.

The authors hope that their monograph will be useful not only to design and production engineers but also to a number of other experts, whose activity in the scientific, industrial, managerial, judicial, educational and humanitarian fields is related to some extent to the problem of protecting the environment and the health of the population.

We express our heartfelt thanks to the entire staff of the L.Ya. Karpov Aerosols Laboratory who participated in selecting, shaping, discussing and critically analyzing the contents of the present monograph.

We hereby dedicate this monograph to the blessed memory of the creator of the PF fibrous materials and the main organizer of their practical utilization, our scientific leader, mentor and teacher, Igor Vasilievich Petryanov-Sokolov.