

# Recent Advances in Broadband Dielectric Spectroscopy

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# Recent Advances in Broadband Dielectric Spectroscopy

edited by

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# Introduction

The primary purpose of the NATO Advanced Research Workshop “Broadband Dielectric Spectroscopy and its Advanced Technological Applications” held in Perpignan, France, 21–24 September 2011, was to facilitate discussions between theorists and experimentalists involved in dielectric spectroscopy concerning both current theoretical issues as well as the manifold applications in various science and engineering disciplines. Thus, scientists utilizing dielectric spectroscopy in areas as diverse as condensed matter physics, colloid chemistry, glass science and engineering, polymer science, rheology, and biophysics had the opportunity to discuss current critical issues in nanotechnology, new materials; life sciences, medical physics; environmental security; landmine detection etc. Participants confronted each other in a congenial manner with their often divergent views and opinions, thus enhancing our knowledge of dielectric phenomena in complex systems. Other important goals of the ARW, which were achieved, were the identification of new areas for investigation and relevant experiments while theoreticians and experimentalists also had the opportunity to become acquainted with each other’s work. The conference presentations were also focused on how relevant instrumentation may be adapted to several major industrial fields. One of the important applications is the development of progressive technologies for the production of novel and advanced materials suitable for military purposes.

This ARW also represented a significant gathering of 45 experts in the rapidly expanding field of dielectric spectroscopy and its applications to science and technology. The participants came from a representative cross-section of the international community, including Belgium, France, Germany, Greece, Ireland, Israel, Japan, Poland, Russia, Spain, USA, and the UK. The official part of the Workshop consisted of invited talks by key speakers working in dielectric spectroscopy and two poster sessions. The ARW was organized into morning and afternoon sessions over a 3 day period. Each session had approximately five speakers with 30 min for the lecture (consisting of 25 min for presentation and 5 min for Q&A). Two poster sessions and a round table discussion were also organized. Original papers concerned with, but not restricted to, the following areas

- Broadband dielectric spectroscopy
- Time domain dielectric spectroscopy
- Relaxation theory and data treatment in the frequency and time domains
- Dielectric relaxation phenomena in polymers, glass forming liquids, porous and grain materials and colloids
- Dielectric spectroscopy in biophysics and nanophysics
- Dielectric properties of diamonds

are available in this volume constituting the proceedings of the ARW.

This meeting would not have been such a pronounced success without the time and effort devoted to its organization by a number of dedicated people. I would especially like to thank all the members of the international and local organizing committees Stéphane Abide, Mikaël Barboteu, Michel Cayrol, Pierre-Michel Déjardin, Yuri Feldman, Friedrich Kremer, Halim El Mrabti, Sylvia Munoz, Ranko Richert, Joëlle Sulian, Serguey Titov, and Belkacem Zeghmati for their efforts in the organization of ARW. Further thanks are due to the University of Perpignan Via Domitia for technical and management help. The organizers acknowledge the generous and extensive support of the NATO Science for Peace and Security Programme. Thanks are due to also our sponsor PRINCETON APPLIED RESEARCH & SOLARTRON ANALYTICAL (a division of AMETEK Advanced Measurement Technology) for financial support and the organization of a successful technical exposition at the ARW. I would like to thank Michael Wübbenhorst for the photos. As far as my role as Editor is concerned, I express my deepest gratitude to Springer Verlag for publication of the Proceedings. Special thanks are due to William T. Coffey for a critical reading of and corrections to all chapters. Finally, I thank all the contributing authors.

Perpignan  
France

Yuri P. Kalmykov

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