

Preface

The aim of the Electron Spin Echo (ESE) Spectroscopy Workshop was to exchange ideas and information and discuss recent achievements and results in this rapidly developing field of radiospectroscopy. Three directions can be indicated where ESE, due to its peculiarities as the time domain spectroscopy, has considerable advantages over the continuous-wave ESR method:

- o the study of weak spin-nuclear, spin-spin and exchange interactions by the analysis of ESE modulation effects;
- o the study of the times of dipole-dipole (phase) and spin-lattice relaxation by analysis of the decay kinetics of ESE signals;
- o the study of the kinetics of chemical reactions and accompanying magnetic phenomena in the time domain.

All these directions are being applied to a range of physical, chemical and biological problems; the definite progress made in the first of these directions is worth noting. Experimental and theoretical development of the Fourier spectroscopy based on ESE permits a novel direction in 'high-resolution ESR spectroscopy' with application to such important areas as solid disordered systems.

In recent years, definite progress has been observed in the applications of ESE to studies of complex biologically important subjects, heterogeneous and photosynthetic systems and to the study of the rates and mechanisms of mobility in various matrices. The number of laboratories, using this method has increased, mainly due to the fact that ESE spectrometers have become commercially available. However, there are a lot of experimental and theoretical problems which still demand the joint efforts of the specialists in this field. One of these, studied in detail in Novosibirsk, is with regard to the regularities of phase relaxation in diluted systems; however, a number of physical problems of this phenomenon remain to be resolved. Nevertheless, the progress in this direction offers wide opportunities for those who study chemical reactions in solids because the ESE method can be used to study in detail the spatial distribution of paramagnetic centres and its transformation during chemical reactions. One can expect a fairly wide range of applications for ESE spectroscopy here in due course, but so far this field has not developed as extensively as the Fourier ESE spectroscopy.

We decided to hold this Meeting in 1991 in Novosibirsk intending to mark some dates which are important for those who work in this field:

- o 35th anniversary since the first record of an ESE signal (Blume, 1956);
- o 30th anniversary of the report on the first record of modulation phenomena in ESE signal decay (Mims, 1961);
- o 25th anniversary since the first paper from Novosibirsk, on ESE in disordered systems, was submitted by V.V. Voevodsky in 1966.

I am grateful to the Siberian Branch of the USSR Academy of Sciences, the International Society of Magnetic Resonance (ISMAR), the International Union of Pure and Applied Chemistry (IUPAC), the Bruker firm and other organizations for their support of this Workshop in such a difficult period for our country and science. I would like to express my warmest thanks to all the speakers, and to my colleagues in Novosibirsk for their efforts in the organization of the Workshop.

Prof. Yu.D. Tsvetkov
Chairman of the Organizing Committee