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# Electronic Properties of Conjugated Polymers

Proceedings of an International Winter School,  
Kirchberg, Tirol, March 14–21, 1987

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With 265 Figures

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## Preface

The International Winter School on Electronic Properties of Conjugated Polymers held March 14–21, 1987, in Kirchberg (Austria) was a sequel to a meeting held in Kirchberg two years before on a similar subject. The 1987 winter school was organized in cooperation with the “Bundesministerium für Wissenschaft und Forschung” in Austria and the “Bundesministerium für Forschung und Technologie” in the Federal Republic of Germany. The basic idea of the meeting was to provide an opportunity for experienced scientists from universities and industry to discuss their most recent results and for students and young scientists to inform themselves about the present state of the research in this field.

As in 1985, the scientific interest was concentrated on the electronic structure of various conjugated polymers and related compounds. The focus of interest in the field now appears to have broadened and covers not only conductivity and relaxation phenomena of polyacetylene but also nonlinear optical properties, highly oriented and single-crystal polymers, and electrochemical and opto-electrochemical properties of special materials such as polypyrrole and polyaniline. Exciting results on conductivity – the mass specific conductivity (i.e., the conductivity divided by the density) of polyacetylene is more than twice that of copper (!) – and a detailed interpretation of the meaning of conjugation length are reported. In spite of the high degree of orientation in several polymers, the mechanism for the conductivity was confirmed to be similar to the mechanism in amorphous systems. Theoretical and experimental results have proved the importance of electron-electron correlation. Possible applications such as electrochemical cells, electrode materials, processable conducting polymers, nonlinear optics devices, etc., are presented and now appear to be much more realistic than in previous reports.

Discussion meetings were devoted to the conduction mechanism and possible limitations of the conductivity of conjugated polymers in general, and to the physical and chemical properties of polyaniline. In addition, a spontaneous meeting on the new high  $T_c$  oxidic superconductors and their relation to the conjugated polymers was held.

This book summarizes the tutorial and research papers presented at the winter school. We thank all the authors for their contributions and all the discussion speakers at the winter school for their stimulating remarks, which played an essential role in making the winter school an exciting and informative event.

We acknowledge in particular the “Bundesministerium für Wissenschaft und Forschung” (Austria) and the “Bundesministerium für Forschung und Technologie” (FRG), as well as the sponsors from industry, for their financial support. This support was not only a great help but was, in fact, indispensable for the goal of the meeting to be attained.

Finally, we thank the manager of the Hotel Sonnalp, Herr J.R. Jurgeith, for his continuous support and for his patience with the many special arrangements required during the meeting.

Wien, Stuttgart  
June, 1987

*H. Kuzmany*  
*M. Mehring*  
*S. Roth*

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