This article was downloaded by: [Tomsk State University of Control Systems and Radio]
On: 21 February 2013, At: 12:38
Publisher: Taylor & Francis
Informa Ltd Registered in England and Wales Registered Number: 1072954
Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK

Molecular Crystals and Liquid Crystals
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/gmcl16

Introduction

Version of record first published: 14 Oct 2011.

To cite this article: (1982): Introduction, Molecular Crystals and Liquid Crystals, 79:1, v-viii

To link to this article: http://dx.doi.org/10.1080/00268948208070983

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.tandfonline.com/page/terms-and-conditions

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Mol. Cryst. Liq. Cryst., 1982, Vol. 79, pp. v–viii
0026-8941/82/7901-000v$06.50/0
© 1982 Gordon and Breach, Science Publishers, Inc.
Printed in the United States of America

Downloaded by [Tomsk State University of Control Systems and Radio] at 12:38 21 February 2013

INTRODUCTION

During the past decade there has been extensive study and a tremendous increase in understanding of low-dimensional solids. These systems are found among molecular, metal complex and polymeric materials. As a result of parallel chains or stacks of molecules, members of these groups of materials frequently have very anisotropic properties and indeed are often "one-dimensional". The availability of such one-dimensional systems has opened opportunities to test the physical concepts developed for one-dimensional systems. The synergism of theoretical and experimental physics with synthetic chemistry has resulted in a dynamic field.

Two recent developments have led to an increase in research activity. In 1977 it was reported (Heeger-MacDiarmid-Shirakawa) that the electrical properties of some insulating organic polymers can be tuned from insulator to metal by doping. In early 1980 a joint French-Danish group (Jerome-Bechgaard) announced the discovery of BCS superconductivity in a molecular stacked conductor. It is clear that the full potential of low-dimensional solids has not yet been explored.

The International Conference on Low-Dimensional Conductors was held at Boulder, Colorado, U.S.A. during 9-14 August, 1981. It was the successor to conferences held earlier in Siofok (1976), New York (1977), Dubrovnik (1978) and Helsingor (1980). The purpose of this conference was to provide an interdisciplinary forum for the discussion of recent experimental and theoretical results in the physics, chemistry and applications of low-dimensional conductors. The vigor of this field is evidenced by the fact that over 235 papers were presented at the meeting, making it by far the largest meeting held in the field to date. The abstracts (by first author) came from 20 countries, with more than one-half contributed by scientists outside the U.S. A list of participants is included in the first volume.

Polyacetylene turned out to be the single most popular material at the conference, occupying two full oral sessions, parts of several others and a full poster session. Soliton theory has grown sufficiently to have warranted a session of its own. With two oral sessions and one poster session, the second most popular material, or more properly set of materials, was $(TMTSF)_2X$, where X stands for one of perhaps a dozen

Downloaded by [Tomsk State University of Control Systems and Radio] at 12:38 21 February 2013

different counter-ions. $NbSe_3$ and its close relatives have expanded to the extent that they occupied the equivalent of a complete oral session and a sizeable portion of a poster session. About half the conference was devoted to other materials, with at most a few papers on any single one, including the favorites of yesteryear, and very many papers on new and exotic materials. It will be interesting to see which of these is starred at the next conference!

The proceedings are being published as a series of volumes (probably five) in "Molecular Crystals and Liquid Crystals". In order to provide the most accurate picture of the present state of the field, with unanswered questions and controversies clearly visible, we have made an effort to minimize interference with the views expressed by the authors in these volumes. The contributions are organized by topic, but of course there is much overlap among both concepts and materials.

The first volume begins with experimental studies of polyacetylene, including interpretations based on the role of solitons in doping, optical properties and, as recently proposed, in electron hopping transport in lightly doped trans-polyacetylene. It continues with papers on the structure and morphology of polyacetylene. In this area the issue of the mechanism of cis- to trans-isomerisation has forced a reexamination of some of the widely used pictures. Finally there is a group of papers on soliton theory, including the recently developed theory of fractional soliton charges in systems of commensurability higher than two and the development of polaron concepts for one-dimensional systems. A later volume will continue with polyacetylene, beginning with a set of papers containing other data and reanalysis of existing data which raise questions about the relevance of the soliton picture and suggest another model. Also presented in this later volume are additional physical and chemical studies of polyacetylene, including electrochemistry and battery applications. Papers on other conducting polymers are included in this later volume, together with theoretical studies of relevance to a number of polymer systems.

The second largest group of papers, to which another volume is devoted, deals with the family of compounds $(TMTSF)_2X$, where X may be PF_6, AsF_6, TaF_6, SbF_6, ClO_4, ReO_4, BF_4, NO_3, etc. All but the last two of these have been found to show superconductivity, with ClO_3 the first to do so at ambient pressure. A most interesting and controversial issue here is the range of temperatures over which superconducting fluctuations exist. Another focus of interest and controversy for these materials is provided by the large changes in conductivity observed in the semiconducting state under dc or ac fields.

In later volumes there will be a group of papers on sliding charge density waves in $NbSe_3$, TaS_3, etc., including a presentation of the tunneling theory and how well it fits the data. Groups of papers on charge density waves, conductivity and other properties, and disorder, in the context of traditional systems such as (TTF) (TCNQ) and (NMP) (TCNQ) appear in later volumes. Also included is work on inorganic platinum chain compounds and macrocyclic systems. A large number of new charge transfer salts are introduced, including work with novel donors. Many other charge transfer salts have been reexamined. New synthetic proceedures are described. Methods for growing large, high quality single crystals utilizing electrochemistry are discussed.

We gratefully acknowledge the partial support of the Office of Naval Research under the Department of the Navy Research Grant N00014-81-G-0055, the National Science Foundation under contract DMR 81-05-315, and the U.S. Army Research Office under contract DAAG 29-81-M-0138.+ We are most grateful also for extensive support from the Xerox Webster Research Center and contributions from "Molecular Crystals and Liquid Crystals", Gordon and Breach Science Publishers, IBM and Exxon Research and Engineering Company. We thank the American Physical Society, one of our sponsors, for carrying out the essential role of administering the funds for the conference. The conference was also sponsored by the Xerox Webster Research Center, "Molecular Crystals and Liquid Crystals" and Gordon and Breach Science Publishers.

We would like to take this opportunity to thank the Program Committee for their assistance. The International Committee was helpful in assuring broad representation at the conference. A list of these committees is given here:

+Under this contract the United States Government has a royalty-free license throughout the world in all copyrightable material contained herein.

++ The contract stipulates that the views, opinions and/or findings contained in these pages are those of the authors and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other documentation.

Downloaded by [Tomsk State University of Control Systems and Radio] at 12:38 21 February 2013

Downloaded by [Tomsk State University of Control Systems and Radio] at 12:38 21 February 2013

PROGRAM COMMITTEE

P.M. Chaikin, UCLA, Los Angeles, California
C.B. Duke, Xerox Webster Research Center, Rochester, N.Y.
A.J. Heeger, University of Pennsylvania, Philadelphia, PA
J.S. Miller, Occidental Research, Irvine, CA
M.J. Rice, Xerox Webster Research Center, Rochester, N.Y.
G.B. Street, IBM, San Jose, CA

INTERNATIONAL COMMITTEE

L. Alcacer	(Portugal)
S. Barasic	(Yugoslavia)
R.H. Baughman	(USA)
K. Bechgaard	(Denmark)
A.N. Bloch	(USA)
J.W. Bray	(USA)
R. Comes	(France)
P. Day	(Great Britain)
J.E. Eldridge	(Canada)
E.M. Engler	(USA)
L.P. Gorkov	(USSR)
A. Janossy	(Hungary)
D. Jerome	(France)
H. Keller	(W. Germany)
J. Kommandeur	(Netherlands)
A.G. MacDiarmid	(USA)
C. Pecile	(Italy)
R. Qian	(China)
J.R. Schrieffer	(USA)
I. Shchegolev	(USSR)
H. Shirakawa	(Japan)
J. Tanaka	(Japan)
M. Weger	(Israel)
F. Wudl	(USA)

The cochairmen are grateful to the staff of the Xerox Webster Research Center for the aid and facilities which enabled this Conference to come to fruition. In particular, the dedicated assistance of Mrs. Marlene A. Elliott and Mrs. Dolores M. Costenoble has been invaluable.

Arthur J. Epstein
Xerox Webster Research Center
Webster, New York, 14580
October, 1981

Esther M. Conwell