GaN and Related Alloys—2000

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GaN and Related Alloys—2000

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CONTENTS

*Invited Paper

GROWTH AND CHARACTERIZATION

*Invited Paper

ELECTRONIC TRANSPORT AND QUANTUM DOTS

*Invited Paper

*Invited Paper

CHARACTERIZATION AND BANDSTRUCTURE

*Invited Paper

QUANTUM DOTS AND PHOTO DETECTORS

ELECTRONIC PROPERTIES AND TRANSPORT

*Invited Paper

LIGHT EMITTERS AND STRAIN CONTROL

LIGHT EMITTERS AND ELECTRONIC DEVICES

*Invited Paper

*Invited Paper

DEDICATION

Isamu Akasaki

These proceedings and a Special Session of the symposium on Gallium Nitride and Related Alloys at the 2000 MRS Fall Meeting are dedicated to Professor Isamu Akasaki for his pioneering achievements in the field of group-III nitride semiconductors. Due to Professor Akasaki's insight, perseverance and ingenuity, group-III nitrides have become a major player in wide band gap semiconductor physics and devices. During the Special Session and a banquet in his honor, the nitride community took the opportunity to thank Professor Akasaki for his work and its impact on science and technology. The banquet at the John F. Kennedy library was attended by over 150 colleagues, and numerous speeches were given in tribute to Professor Akasaki.

Isamu Akasaki received his B.S. degree from Kyoto University in 1952 and his Ph.D. from Nagoya University in 1964. He then joined Kobe Kogyo Corporation, which now is Fujitsu Ltd., as a member of the research staff. He worked on electronic materials, electroluminescence, and developed scintillators. Then in 1959 he returned to Nagoya University progressing in the positions of research associate, assistant professor, and associate professor. His work there centered around the vapor phase epitaxy (VPE) of Ge.

From 1964 through 1981, Dr. Akasaki headed the Fundamental Research Laboratory at the newly established Matsushita Research Institute Inc., Tokyo. Among the highlights of his research in optoelectronics were the world's purest GaAs at the time by VPE (1968), and the brightest GaP red LED (1970). His research on the nitrides started in 1966 with VPE and the optical properties of AlN. Then in 1974 he grew the very first GaN single crystal by MBE, and later his group developed the first flip-chip GaN blue LED.

In 1981, Dr. Akasaki was appointed as a full professor at Nagoya University where he conducted research on compound semiconductor materials and devices, with special emphasis on group-III nitrides. He found significant improvement of crystalline quality of nitrides by pioneering the low-temperature deposited buffer layer technique (1986). He and his group realized p-type conduction in nitrides (1989) and then the GaN p-n junction LED (1989). Conductivity control of n-type nitrides followed in 1989, and room temperature stimulated emission from the nitrides in 1990.

Beginning in 1992 Professor Akasaki has been working at Meijo University, Nagoya, where since 1996 he has directed a High Tech Research Center focusing specifically on group-III nitrides, and the list of firsts continues to the present day.

For his outstanding achievements, Professor Akasaki has received a long list of awards and prizes. Special tribute must be paid to Professor Akasaki for persevering in the nitrides, when in the light of the material's problems, almost everyone else had left the field. He kept working and finally by developing the low-temperature deposited buffer layer and p-type conduction, he succeeded and initiated the breakthrough of the nitrides. It is because of his achievements that this field has since seen revolutionary development.

Thank you, doumo arigatou, Professor Akasaki!

S. P. DenBaars and C. Wetzel

PREFACE

Symposium G, "Gallium Nitride and Related Alloys—2000" was held November 27–December 1 at the 2000 MRS Fall Meeting in Boston, Massachusetts. During 10 half-day oral sessions, 21 invited talks and 75 contributed talks were given. In 3 poster sessions, 181 posters were presented. This nitride symposium had the largest abstract submission of the conference.

In a Special Session and a well-attended banquet, the nitride community honored Professor Akasaki for his achievements in this field.

This year's nitride symposium provided an integrated view of advances in both the basic sciences and the technology of group-III nitride electronic and optoelectronic devices. The devices discussed at the conference included high frequency, high power, and high temperature devices as well as light-emitting diodes, laser diodes, and UV photodetectors. Topical challenges and future goals for the advancement of this rapidly progressing field included the further optimization and stabilization of growth processes, and growth of GaInN, AlGaN, AlInN, and quaternary layers. Also covered were advanced dislocation control, models of the growth kinetics, implications of piezoelectric polarization, the roles of defects, dopants, and contaminants, optimization of light emission and electron transport mechanisms, layer lift-off techniques, ohmic and Schottky contacts, as well as general GaN-based device processing.

The proceedings of this symposium capture the most exciting developments of this rapidly progressing and commercializing field. This volume will be useful for both established researchers working on nitrides and for the students of this novel science and technology.

Christian Wetzel
Michael S. Shur
Umesh K. Mishra
Bernard Gil
Katsumi Kishino

December 2000

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T. Makimoto
B. K. Meyer
B. Monemar
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