1977-SY-E-Tokyo-Tech-EEIC-Engrg.

SAKAI Yoshio

“Fabrication of InSb Thin-film Hall Devices and Pioneering Work in the field of Semiconductors”

Brief Background

Born on December 5, 1916
1935 - 1939 Electrical Laboratory, Ministry of Communications
March 1943 Graduated from Tokyo Institute of Technology
May 1949 Lecturer, Tokyo Institute of Technology
November 1953 Associate Professor, Tokyo Institute of Technology
August 1963 Professor, Tokyo Institute of Technology
March 1977 Retired from Tokyo Institute Technology
1977 Professor Emeritus, Tokyo Institute of Technology.
1977 Professor of Aoyama Gakuin University
1985 Retired from Aoyama Gakuin University
2005 Died

Summary

Noting that the theory of the p-n junction was first introduced in the U.S. in 1949, you will be convinced that Sakai Yoshio is a pioneer in the research field of semiconductors.

(1) The dissertation Sakai Yoshio was about the rectifier made of cuprous oxide. In those days, numerous cuprous-oxide rectifies were fabricated and a few good ones were selected for practical use. The yield was extremely low. Aa Sakai Yoshio explained how the cuprous-oxide rectifier works using the band model, which was not well known then, for the first time. The theoretical understanding of the cuprous-oxide rectifier dramatically improved the yield and made a great contribution to wide spread of the cuprous-oxide for a commercial use. Based on his accomplishment in the cuprous-oxide rectifier, he authored the book entitled “Metal-Semiconductor Contact Rectifier”. The word “semiconductor” was used in Japan for the first time.

(2) After his contribution to development of the cuprous-oxide rectifier, Sakai Yoshio extended his research area to the selenium-based rectifiers and selenium photovoltaic devices.

(3) One of other great accomplishments to be mentioned includes development of the indium-antimonide, InSb Hall device. Sakai Yoshio took notice of the sensitivity of the Hall device which increased with the increased mobility and decreased device thickness and fabricated the Hall device. He improved the material quality of InSb by the newly developed three-temperature growth method, in which the temperatures of substrate and sources of In and Sb were independently controlled. [1)] The technique is now well known as molecular beam epitaxy MBE. This growth method developed by Sakai Yoshio is still now used by Asahi Chemical Co. to manufacture the InSb Hall devices which are widely used as direction sensor in cellular phones. Asahi Chemical Co. has a top share of Hall devices in the world.

(4) Sakai Yoshio nurtured many excellent researchers and educators in the field of semiconductors. One of them is the former president of Aoyama Gakuin University, Dr. KUNIOKA Akio.

(5) Awards:

1976 Science and Technology Achievement Award from Tokyo Metropolitan Government

1990 The Third Rank of The Order of the Rising Sun, Gold Rays with Neck Ribbon from Government of Japan

(6) Reference

1) Preparation on InSb film and Characteristics Hall-effect Devices ,
Denki Gakkai Shi Vol. 80, No. 857, p. 166 (1960)

(Presented by TAKAHASI Kiyoshi on May 8th, 2021)