

Introduction

In recent scientific history Australia and Japan have been especially active and gained international acceptance as centres of excellence in the areas of gaseous electronics. In this area of study, the identity and behaviour of all species—both charged and neutral, molecular and fragmented—in ionised gases are studied and theoretically modelled.

Within both countries a wealth of knowledge and experience in high temperature plasma physics has flowed into this area with a special focus on plasma processing. This has brought together into one research area fundamental physics, electrical engineering, and physical chemistry. In 1988 Professors R. W. Crompton and M. Hayashi held the first of an on-going series of Japan–Australia workshops in Sydney just prior to the Bicentennial Physics Congress. A second one was held at Gotemba in Japan in 1990 and recently (1994) a third was successfully hosted by Dr R. E. Robson of James Cook University and held at Yeppoon in Queensland. The limited participation of thirty, plus observers, came from universities, government research organisations, CSIRO and industry.

The topics covered are fundamental electron and ion swarm collision processes, diagnostic techniques and computer modelling, together with a range of applications such as plasma processing of intractable waste, ozone production for water remediation, electrostatic precipitation and lasers. The range of topics covered is well described by the contents of this special issue of the AJP. The papers presented here describe the leading edges of research in this rapidly expanding area of physical science. Most of the attendees at the workshop have contributed up to the minute descriptions of their current work.

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