

### **132d Electrochemical Generator for the Supply of Arsine to the Ion Implant Market**

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The reliable, consistent and safe delivery of doping gases to an ion implanter is key to productive and efficient semiconductor manufacturing operations. Air Products and Chemicals, Inc. has developed a novel, cost effective electrochemical generator for the in situ generation of arsine that has been shown to be a safe and reliable source of arsine. The arsine generator utilizes the electrochemical reduction of pure arsenic metal in a caustic electrolyte solution to generate a pure arsine and hydrogen feed gas to the ion implanter. A sacrificial metal anode provides the balance of the electrochemical system and prevents the formation of oxygen. Arsine generated on demand can be used as a drop in replacement for existing arsine supply cylinders directly into ion implant gas cabinets and unlike other passive source of arsine the arsine generator maintains an inventory of only 1 gram of arsine during operation.

The electrochemical generator offers a number of advantages over conventional arsine systems. The arsine gas is generated at a constant sub-atmospheric pressure delivering a consistent 90% pure arsine (10% hydrogen) that meets or exceed arsine delivered via adsorption methods. With high arsine capacity, the generator can be operated for months of consistent reliable service. Safe operation is facilitated with easy on-off electrical control maintaining a low sub atmospheric inventory of arsine in the system during operation. Consistent, clean ion beam currents are obtained over months of operation using the electrochemical generation technology. The presentation will highlight the theory and applications of this novel form of safe arsine delivery.