



## FOR IMMEDIATE RELEASE

### **RASIRC Technology Successfully Used to Clean and Prepare Germanium Surfaces** *High Purity Hydrogen Peroxide Vapor Delivered In-Situ*

**San Diego, Calif. – October 21, 2014 – RASIRC®**, the leader in delivery of dynamic vapors, announced independent test results that show high purity hydrogen peroxide vapor delivered to process by RASIRC technology enables removal of carbon-based contaminants from Germanium surfaces. A subsequent anneal removes oxygen. In addition, the hydrogen peroxide dosing creates an ideal surface for atomic layer deposition (ALD). RASIRC develops dynamic vapor generation technology that deliver high purity vapor to key semiconductor and photovoltaic manufacturing processes.

“Recent tests performed and documented by researchers at the University of California, San Diego (UCSD) show that high purity hydrogen peroxide vapor enabled atomic layer deposition after cleaning Germanium with hydrogen peroxide vapor,” said Jeffrey Spiegelman, RASIRC Founder and President. “RASIRC is the only company able to create a consistent hydrogen peroxide vapor. Alternative delivery techniques generate droplets that contaminate and pit Germanium surfaces.”

Researchers at UCSD performed a series of tests to determine the best method to clean and prepare Germanium surfaces for ALD. Germanium is an attractive material for electronics manufacturers because of its much faster data transmission potential. Previous cleaning methods that involved liquid baths are not suitable for Germanium because Germanium easily dissolves and is removed from thin layers and new architectures. Contaminants must be removed without any damage to Germanium in the underlying surface. Similarly, cleaning and preparation must be performed in situ, as any transfer from bath to chamber leads to more contamination.

Initial tests used high purity hydrogen peroxide dosing at 300m Torr and 300C. This dramatically reduced the carbon signal and generated some Germanium oxide. Subsequent heating to 700C desorbed the oxide and eliminated the oxygen contamination. Another loop of dosing and annealing further reduced the carbon. A final longer dose of hydrogen peroxide resulted in a contaminant-free surface that was planar.

Because high temperatures can damage surfaces, a second test used atomic hydrogen dosing in place of the annealing step. This process was also effective at removing the residual oxygen layer. A final short pulse, high temperature anneal left a well-ordered surface with low roughness.

“The industry is reaching the limits of liquid chemistry for cleaning new materials and architectures,” said Spiegelman. “In the near future many processes will have to move to vapor. RASIRC technology is ready to support these processes.”

RASIRC offers a range of products for high purity hydrogen peroxide vapor generation and delivery. These products can deliver hydrogen peroxide concentrations up to 30,000 ppm and flow rates from 10 sccm to 30 slm. For more information on which product best suits your application, contact RASIRC at [info@rasirc.com](mailto:info@rasirc.com).

For more detail on the research study “*In-situ non-disruptive cleaning of Ge(100) using H<sub>2</sub>O<sub>2</sub>(g) and atomic hydrogen*”, contact RASIRC at [info@rasirc.com](mailto:info@rasirc.com).

### **About RASIRC**

**RASIRC** products purify and deliver ultra-pure liquids and gases. First to generate ultra-high purity (UHP) steam from de-ionized water, RASIRC technology now also delivers hydrogen peroxide vapor in controlled, repeatable concentrations. It reduces cost, increases yield, and improves safety. RASIRC vapor delivery systems, humidifiers, closed loop humidification systems, and steam generators are critical for many applications in semiconductor, photovoltaic, pharmaceutical, medical, biological, fuel cell, and power industries. Call 858-259-1220, e-mail [info@rasirc.com](mailto:info@rasirc.com), or visit [www.rasirc.com](http://www.rasirc.com).

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