FOR IMMEDIATE RELEASE

RASIRC Presents on Surface Passivation of New Channel Materials at UCPSS

Atomic Layer Passivation enabled Hydrogen Peroxide Gas First Step

San Diego, Calif – September 6, 2016 –RASIRC will present a paper on innovations in surface passivation of new channel materials at the upcoming 13th International Symposium on Ultra Clean Processing of Semiconductor Surfaces (UCPSS) held September 11-14 in Knokke-Heist, Belgium. Chief Technology Officer, Daniel Alvarez, Ph.D., will present "*Surface Passivation of New Channel Materials Utilizing Hydrogen Peroxide and Hydrazine Gas*" on Monday September 12 at 10:00 in Session 1A – FEOL: Surface Chemistry Group IV. The benefits of peroxide gas and hydrazine gas will be discussed at Stand #18.

Gas Phase Passivation Methods

New channel materials need improved carrier confinement and mobility. A smooth dense interface layer is critical to achieve these improvements. In situ gas phase interface initiation and passivation provide a seed layer to prevent metal migration and provides functionalization for subsequent High *k* material deposition. Hydrogen peroxide gas creates terminating -OH layers; hydrazine gas creates terminating -NH layers.

Surface Passivation and Hydrogen Peroxide Gas

Hydrogen peroxide gas is a novel oxidant that improves passivation and nucleation density at semiconductor interfaces when compared to water. Previous delivery methods of H_2O_2/H_2O gas mixtures have had limited success. Liquid anhydrous hydrogen peroxide is highly unstable and decomposes rapidly. Alvarez will discuss a novel

approach entailing a membrane delivery system and an organic solvent that enables delivery of pure hydrogen peroxide gas.

“Anhydrous hydrogen peroxide gas delivers denser surface functionalization and faster initiation than other sources, as shown by both universities and industrial users,” said Jeffrey Spiegelman, RASIRC President and Founder. “Our innovative new gas molecules and gas delivery systems directly address the challenge of surface passivation for new materials including SiGe.”

Hydrazine Gas and Nitridation

Under the proper conditions, anhydrous Hydrazine gas can be an effective low temperature nitridation source. Hydrazine can over come limitations imposed by plasma to create a thin layer of silicon nitride in high aspect structures. The nitride passivation layer is needed to limit diffusion across the dielectric interface in FINFETS or MOSFETs. As with BRUTE® Hydrogen Peroxide, RASIRC uses a similar BRUTE membrane delivery system to enable delivery of pure hydrazine gas.

“Anhydrous hydrazine gas is the best nitride source for high growth rates at lower temperature when plasma is not feasible,” said Alvarez. “These new molecules enable in situ dry surface preparation and passivation without sub-surface damage over a wide range of device materials and structures.”

Exhibit Stand

UCPSS Conference attendees are invited to visit RASIRC at stand #18. Representatives will be available to answer any questions and discuss exciting results from recent customer testing. Stop by to get the latest research papers and see a demonstration model of our unique solvent-based delivery system for safety, used for BRUTE Hydrogen Peroxide and BRUTE Hydrazine. Also learn about the Peroxidizer® for high-volume surface hydroxylation and atomic layer deposition. Ask about Hydrogen Peroxide Steam.

About BRUTE Peroxide

BRUTE Peroxide delivers anhydrous H_2O_2 gas. Process engineers can now use H_2O_2 gas by itself, or with a carrier gas. This is the first time that H_2O_2 gas and water vapor can be differentiated in process reactions.

About BRUTE Hydrazine

BRUTE Hydrazine delivers water-free hydrazine (N_2H_4) gas into atomic layer deposition (ALD) processes. Brute Hydrazine provides a safer way to handle Hydrazine. Precursor vapor pressure is maintained at levels viable for thin film processing under vacuum with or without a carrier gas.

About Peroxidizer

The Peroxidizer delivers high concentrations of hydrogen peroxide gas to semiconductor processes at low temperatures and/or low pressures. In the Peroxidizer, a hydrogen peroxide liquid pervaporates across a membrane. This enables generation of a stable and high concentration of H_2O_2 gas with minimal susceptibility to downstream process conditions. The Peroxidizer only needs standard semiconductor grade liquid H_2O_2 to support a wide range of process and H_2O_2 delivery conditions.

About RASIRC

RASIRC specializes in products that generate and deliver gas to fabrication processes. Each unit is a dynamic gas plant in a box—converting common liquid chemistries into safe and reliable gas flow for most processes. First to generate ultra-high purity (UHP) steam from de-ionized water, RASIRC technology can now also deliver hydrogen peroxide gas and hydrazine gas in controlled, repeatable concentrations. RASIRC gas delivery systems, humidifiers, and closed loop humidification systems are critical for many applications in semiconductor, photovoltaic, pharmaceutical, medical, biological, fuel cell, and power industries. Call 858-259-1220, email info@rasirc.com or visit www.rasirc.com.

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