

# CFD Modeling of Surface Reaction (CVD and ALD) with ANSYS Fluent

## Introduction

Computational modelling of semiconductor manufacturing equipment and processes is a multi-disciplinary effort drawing from diverse fields such as fluid mechanics, heat/mass transfer, electromagnetics, and plasma physics/ chemistry. Over the years, significant strides have been made in the semiconductor industry to make modelling an integral part of the equipment, and process design.

ANSYS has been able to successfully address a wide variety of semiconductor manufacturing technologies including Chemical Vapour Deposition (CVD), Atomic Layer Deposition (ALD), etching, electroplating, RTP, epitaxy etc. This seminar discusses surface reaction (CVD and ALD) modelling using ANSYS Fluent, to enhance process understanding, and reduce time and costs in semiconductor industry.

## Objectives

This seminar aims to provide an introduction on CVD and ALD process modelling using ANSYS FLUENT to our semiconductor partners. Subsequently, participants will have hands-on practice and an opportunity to interact with ANSYS expert on surface reaction modelling.

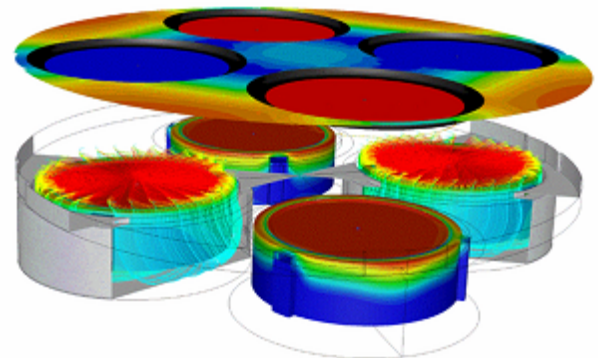
## Benefits

- Enabling realistic multi-physics and multi-disciplinary surface reaction simulations.
- Process engineers directly benefit from engineering simulations.
- Reduce development cost and expensive trials in semiconductor fabrication.
- Facilitates innovative new designs and concepts.
- Process Optimization.

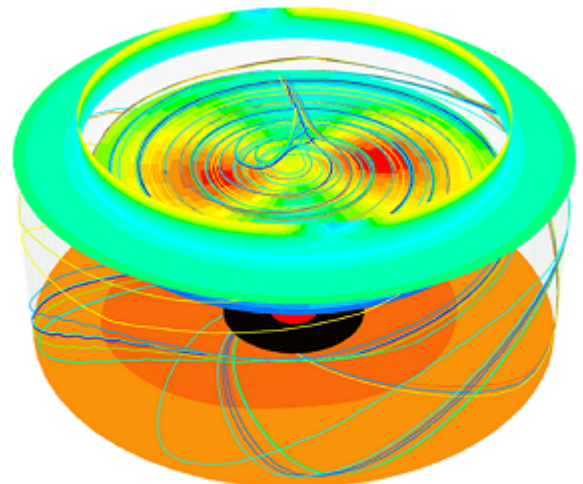
## Who Should Attend

Engineers and technical managers interested in CVD/ALD simulation.

## What customers say about our solutions



Pathlines of SiH<sub>4</sub> concentration, contours of WF<sub>6</sub> concentration, and pressure contours on the showerhead in a Novellus 300 mm reactor. Courtesy of Novellus Systems, Inc.



Flow path lines, concentrations of AsH<sub>3</sub>, GaAs deposition on a substrate in a MOCVD system. Courtesy of Emcore Corporation

"ANSYS is a very formidable simulation tool in speeding up R&D work and reducing the needs of multiple design iterations."

**Wihaga Satya Khresna, Lead Engineer, Halliburton Sperry Drilling Technology**

"We use ANSYS software because we need to speed up our development process for new products by speeding up all phases of design. With simulation we can investigate inside our products virtually, not physically, and look at detail that would be impossible to evaluate otherwise. We can improve the efficiency of our products by investigating small changes in parameters and spend less time than we would for creating a real prototype and testing."

**Matteo Cipelli, Advanced Engineering COE Manager, Lowara Srl**

"Without ANSYS, we would go in blind designing new reactors or making modifications to existing equipment. The confidence level that we get from using simulation is very high: We generally understand the preferred direction to pursue, rather than going in all possible directions."

**Matteo Fumagalli, Innovation Engineer, MEMC**

"ANSYS software improvements have led to reduced run times; multiphase and turbulence models have a greater ability to handle primary and secondary phases."

**David Stanbridge, Managing Director, Swift Technology Group**

### Guest Speaker



Pravin Nakod has been working with ANSYS for 9 years and has expertise in modeling combustion and reacting flows. Modeling turbulent gas combustion, LES combustion, coal/biomass combustion and gasification, oxy-fuel combustion; gas turbine combustion, pollutants formation, fire modeling, Chemical Vapor Deposition, etc. are his topics of interest. As a member of the ANSYS International Support and Services group, he has worked with customers from North America, Europe and Asia. He has several journal and conference publications. He obtained his M Tech from IIT Bombay (Mumbai) in Thermal and Fluid Engineering.

### Course Information

**Date** : 26th November 2014 (Wednesday)

**Time** : 9:00 am - 12:00 noon

**Venue** : CAD-IT Consultants (Asia) Pte Ltd

159 Sin Ming Road, #03-05, Amtech Building, Singapore 575625 ([view map](#))

#### Agenda

9:00am - 9:30am	Registration
9:30am - 10:30am	Introduction to Surface Reaction Modelling using ANSYS FLUENT
10:30am - 11:00am	Tea Break
11:00am - 12:00pm	Hands-on session
12:00pm - 12:30pm	Q & A
12:30pm	End

**Register NOW**

- Register online for this FREE one-off seminar.
- Seats are limited and allocated on a first-come-first-serve basis. So please book your place early to avoid disappointment.
- CAD-IT Consultants reserves the right to cancel or postpone the event due to unforeseen circumstances.

## About CAD-IT Consultants

Founded in 1991, CAD-IT is a leading global ISO 9001:2008 certified Product Life Cycle Management (PLM), manufacturing and education provider. CAD-IT's mission is to provide world-class solutions and services that enable companies and their supply chains to achieve greater product innovation, quality and productivity with drastically reduced time-to-market and costs.

CAD-IT is honored to have received over 80 international and national awards since its inception for marketing and service excellence. Among its most recent accolades are the Singapore Enterprise 50 Award (2013, 2012), Singapore SME 1000 (2014, 2013, 2012, 2011), Asia Pacific Entrepreneur Award (APEA) - Outstanding Entrepreneur Award (2012, 2010, 2009), the Singapore Prestige Brand Award SPBA - Established Brand Award (2012, 2011, 2010, 2009), SPBA - Regional Brand Award 2012 and SPBA - Hall of Fame 2012.

CAD-IT Consultants' suite of PLM solutions include ANSYS (System-level, Multiphysics Simulation), Goldfire Innovator (Innovation Process Management), Moldflow (Plastics CAE), Stampack (Sheet Metal Forming), Deform (Bulk Metal Forming CAE), SpaceClaim (3D Direct Modeler), Mentor Graphics Valor DFM (Design For Manufacturing), Valor MSS (Complete Manufacturing Execution Suite) and Cortona3D (3D Technical Documentation).

Since February 2010, CAD-IT has partnered the Singapore Workforce Development Agency (WDA) to offer Advanced Certificate courses in PLM and Engineering Simulation, under the Workforce Skills Qualifications (WSQ) framework, with the charter to upgrade the technological capabilities of organizations in Singapore so as to enable them to undertake high value-add design, engineering, manufacturing and R&D activities.



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