

Exhibit A

Curriculum Vitae



Alexander D. Glew, Ph.D., P.E.

Employment History

From: 1997
To: Present
Position: **Glew Engineering Consulting, Inc.**
Mountain View, California
President
Clients include companies from semiconductor equipment, plasma generation, vacuum systems, fluid delivery systems, flow and pressure component suppliers, laser manufacturers, consumer electronics, industrial electronics, vehicle, telecommunications, and others. Consulting work includes thin film characterization, process development, project turn-around/rescue, gas flow and vacuum metrology, design of experiments, corrosive gas applications, finite element analysis and related market analysis.

From: Aug 1987
To: Jan 1997
Titles
Project Mgr.
Jan 1996 to
Jan 1997
Applied Materials, Inc.
Santa Clara, California
Engineering Manager, Core-Technologist

- Sat on corporate engineering/technology (ET) council, one of 15 council members. Responsible for corporate direction in gas delivery technology for all divisions, including CVD, EPI, PVD, RTP, etch, thermal and others. Also, qualified gas and vacuum component selections. Consulted with all divisions on gas and vacuum systems, liquid source delivery systems, components, and supplier selections.
- Received patent for improved tungsten (W) CVD deposition.
- Successfully proposed and executed a project that SEMATECH S100 funded. The goal was to develop industry methods to determine the effects of trace chemicals on semiconductor processing and equipment reliability. This resulted in two SEMATECH Technology Transfers listed below. First, ppb levels of impurities were introduced into both a Tungsten CVD deposition process and an aluminum etching process. The effect on particle generation, deposition rate, uniformity, selectivity and incorporation into the film were examined. This work resulted in a 30% increase in deposition

CVD
Supplier
Quality
Engineering
Manager

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Core Technologist	<p>rate. Similarly, ppb-ppm levels of impurities were introduced into HBr gas systems and accelerated lifetime tests were conducted at three sites across the country. Measured by quadrapole mass spectrometry gas composition in situ of Tungsten CVD and Al Etch process.</p> <ul style="list-style-type: none"> • Responsible for gas, vacuum and chemical components evaluation, testing and supplier quality management. Managed an engineering group that tested and recommended gas, vacuum and chemical components for the CVD division, and developed process controls at suppliers. Supervised laboratory and trained individuals to develop specialized testing capabilities to characterize gas delivery and vacuum components. Also supported Etch, PVD and other divisions with common suppliers including vacuum pumps, vacuum transducers, flow controllers, valves and similar.
CVD Engineering Manager	<ul style="list-style-type: none"> • Managed group of engineers and support personnel who developed gas panels and liquid source delivery systems for dielectric deposition. Delivered TEOS, TMP, TMB and many other organometallic precursors for SG, BPSG dielectric deposition. Developed organometallic CVD systems extensively.
Systems Engineer	<p>Designed multiple liquid source delivery systems for organometallic chemical precursors, i.e. bubblers, boilers, injectors.</p> <ul style="list-style-type: none"> • Managed CVD division design support group: CAD designers, drafters and CAD systems for division. Brought in first 3D CAD systems. Brought in first FEA program. • Established and managed the customer engineering special group for the CVD division, which engineered all equipment modifications to meet customer specifications. These modifications included changes across the entire system, including process chambers, vacuum systems, gas delivery, power distribution, safety and robotics. • Worked on the development and release of the landmark product, Precision 5000 CVD, one of which is now in the Smithsonian Institute. This was the first cluster tool for semiconductor manufacturing. • Developed dielectric layers of silicon dioxide (glass or USG), boron phosphorous silicon glass (BPSG), phosphorous silicon glass (PSG), nitride, oxy-nitride, and others. • Responsible for flow and vacuum equipment suppliers for company including MFC, valves, mechanical vacuum pumps, cryo-pumps, dry pumps, and others. Supported multiple divisions on these matters.

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Doctoral Dissertation:

From: 1996 Stanford University
To: 2002 Stanford, California
Ph.D.

Completed a dissertation in the department of Materials Science & Engineering leading to the Ph.D. degree.

Research includes:

- Plasma Deposition of Diamond-Like Carbon and Fluorinated Amorphous Carbon and the Resultant Properties and Structure
- Characterized stress, strain and hardness of films. Related the stress energy state to the diamond like nature of the thin films.
- Investigation of deposition mechanism fluorinated amorphous carbon (FLAC) and diamond-like carbon (DLC), low k dielectric materials.
- Modeled and conducted experiments on mechanism of ion energy, momentum and flux dependence for FLAC and DLC film synthesis in radio-frequency plasma discharges, including competing mechanisms of sub-plantation, ion-peening, sputtering, and etching.
- Constructed and instrumented a multi-purpose processing chamber for CVD, etch, and sputtering with measurement capability.
- Fabricated MIS capacitors to investigate the dielectric properties of fluorinated amorphous carbon (FLAC). Performed all wafer processing to construct MIS capacitors, including lithography, etch, CVD and PVD.
- Conducted thin film analysis including UV absorption spectroscopy, spectral ellipsometry, multi incident angle ellipsometry, Fourier transform infrared spectroscopy, profilometry, nano-indentation, and gravimetric measurements.
- Modeled dielectric properties and dispersion relationship of fluorinated amorphous carbon (FLAC), and compared spectral ellipsometric measurements to results of electrical CV tests and thickness measurements by profilometry using MIS structures.

Consulting History

From: 2020 Sydney Metro, Australia
To Ongoing Analysis of the equipment, replacement, and cost of moving a semiconductor FAB in order to put a metro rail line through the area.

From: 2019 TDA Research Institute
To: 2020 Analysis of high temperature reactor.

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From: 2019 LED Manufacturer
To: 2019 Thermal analysis of new LED designs.

From: 2019 Elwood Mill Products
To: 2019 Professional Engineering review of capital equipment. Finite element analysis.

From: Sept. 2017 UNICO
To: Jan 2018 Finite element analysis of new product concepts.

From: July 2017 Elwood National Forge
To: Dec 2017 Professional Engineering review of capital equipment. Finite element analysis.

From: April 2017 Jon Richards Co. (for Disneyland)
To: May 2017 Professional Engineering review of electric vehicle used as float at Disneyland.

From: 2017-2019 Licensed Mechanical Engineering
To: Ongoing Professional Engineering letters and calculations for submission to building and environmental health departments. Miscellaneous clients.

From: 2016 Sola;t
To: Ongoing Reverse engineering of OLED display technology.

From: 2016 VWR
To: 2017 Review of new semiconductor technologies for etching and particle reduction in semiconductor processing chambers.

From: 2016 TDA Research
To: 2017 Finite element analysis of effluent treatment system for power plant carbon reduction treatments.

From: 2016 Champion Telecom
To: Ongoing Engineering support, Finite element analysis, and design of “Cell Towers on Wheels” (COWs). Multiple projects. Analysis of trucks used to support emergency telecommunications.

From: 2016 CarbonTech

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