Christopher J Harris

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Goal

Return to the *industrial sector*, to create new products or improve existing ones, whether the target entity involves material, equipment, software, or humans.

Profile

Chemical Engineer with over 20 years of graduate research in the semiconductor realm seeking to redefine opportunity:

crystal growth	plasma chemistry	computer modeling
surface science	laser excitation	python language
chemical vapor deposition	optical characterization	statistical analysis
molecular beam epitaxy	electrochemical methods	process control
semiconductor devices	applied neuroscience	laboratory automation

Literature

Real-time Monitoring of Surface Processes by P-polarized Reflectance, J. of Vacuum Science & Technology: **1997**, *A15*, 807.

Molecular Layer Epitaxy by Real-time Optical Process Monitoring, Applied Surface Science: **1997**, *112*, 38.

Boron Incorporation in Hydrogenated Amorphous Silicon Films Prepared by Chemical Vapor Deposition, J. of Noncrystalline Solids: **1987**, *97*, 1419.

Laser-induced Chemical Vapor Deposition of Hydrogenated Amorphous Silicon: Photovoltaic Devices and Material Properties, Solar Cells: **1987**, *21*, 177.

Milestone

Invent a new approach for process control to optimize laser power.

Write a Pascal based data acquisition program for DOS environment in 1986, long before LabView enters the Windows market.

Analyze optical signals from a ceramic powder reaction chamber, leading to a computer monitoring scheme, which replaces a human operator.

Construct interferometer to measure film thickness, providing a realtime signal, to calibrate growthrate.

Refine process control loop to stabilize laser power, producing a steady deposition rate with reliable material properties.

Collect in-situ stress measurements of growing films, through deflection of an optical laser, as sample curvature evolves.

Grow the first laser-induced, chemical vapor deposition, amorphous silicon solar cell.

Develop a microwave plasma, chemical vapor deposition system, to create polycrystalline diamond from methane gas, in a regime where kinetics dominates over thermodynamics.

Achieve a unique ellipsoidal plasma advantageous for film growth over spherical plasmas.

Monitor the surface evolution of compound semiconductor heterostructure films, in a chemical beam epitaxy system, with plane polarized reflectance spectroscopy.

Design a radio frequency nitrogen plasma source for GaN film growth.

Measure substrate temperature derived from plane polarized reflectance.

Apply cyclic voltammetry to find: catalytic activity in gold compounds for methanol oxidation, and electrochemiluminescence in a ruthenium compound for DNA analysis.

Experience

Engineering Consultant, Communo: Philadelphia, PA (1/18 to present)
Research Assistant, Maine Chemistry Dept: Orono, ME (8/03 to 5/06)
Research Assistant, NCSU Materials Science Dept: Raleigh, NC (1/87 to 5/99)
Research Specialist, MIT Advanced Energy Materials Lab: Cambridge, MA (11/84 to 1/87)

Education

MS *Physical Chemistry*	Rutgers: New Brunswick, NJ	Jan 2003
MS *Material Science*	North Carolina State: Raleigh, NC	unofficial
BS *Chemical Engineering*	Texas A&M: College Station, TX	May 1984
HS *Diploma*	Waltham High: Waltham, MA	Jun 1979

Honor

Bausch & Lomb Science Award