Dr. Charles Lakeman

TPL Inc.

Soft Lithography - An Emerging Microfabrication Technology for Advanced Miniaturization: Making the Business Case for a New Technology

University of Missouri-Rolla Ceramic Engineering Seminar Series Speaker
September 25, 2003

McNutt Hall, Room 204
3:30pm

Biography:

Dr. Charles Lakeman has over 15 years experience in the chemical synthesis and preparation of materials for electronic and electrical applications. He has been instrumental in developing Microcontact Printing (μCP) as a novel microfabrication process for non-silicon materials for applications including integrated passive devices and volumetric MEMS-scale electrochemical power supplies. Dr. Lakeman earned a B.Eng. degree with Honours from the University of Leeds, UK (1988), and MS (1991) and Ph.D. (1994) degrees both from the University of Illinois at Urbana-Champaign under the tutelage of Dr. David Payne. While in his graduate studies he was a visiting researcher to the University of Tokyo, Japan. Prior to joining TPL in March 1998, he was employed by Texas Instruments (TI) transferring ferroelectric thin film technology from Sandia National Laboratories and completed a post-doc with Professor Fred Lange at the University of California at Santa Barbara. Dr. Lakeman has been awarded one patent on his work with TI, has filed four patent applications on MEMS scale electrochemical power supplies, and has given numerous invited and contributed presentations on chemical processing and properties of ceramic thin films. He is currently an Advanced Scientist in the Specialty Materials group at TPL, Inc., an advanced technologies company in Albuquerque, NM.

Abstract:

Soft lithography MicroContact Printing (μCP) is a novel, additive process for microfabrication of near-net-shape structures with feature sizes that range from 100s of microns to the sub-micron scale. At TPL, we have used this technology to integrate passive components for electronic circuits and build unique volumetric integrated batteries and supercapacitors.

In this presentation, we will demonstrate the application of our technology to both integrated passives as well as integrated volumetric micropower devices. For passives, emphasis will be placed on processing conditions, and materials properties, while multi-component test structures demonstrate the feasibility of this process for integrated passive device fabrication. In addition we will also illustrate developments in micropower devices emphasizing device performance, as well as potential for integration with microsystems.

We will also discuss some of the lessons learned about commercializing a new technology. For scientists and engineers, the benefits of a new technology are often believed to be self-evident; however, in the real world, technology never sold anything! How, then, do we as scientists make the business case for our novel ideas? This presentation will address some of the steps we are taking to move this science from the bench top to the market.

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