conferenceseries.com

International Conference on

Physics

June 27-29, 2016 New Orleans, USA

# Double pulse laser deposition of polymer nanocomposite films for optical sensors and light emitting applications

**Abdalla M Darwish[1], Aziz Muhammad[1], Deonte' Alexander[1], Brent Koplitz[2], Micheal Johnson[2], Xiaodong Zhang[2]** and **Sergey Sarkisov[3]**
[1]Dillard University, USA
[2]Tulane University, USA
[3]SSS Technologies Inc., USA

The objective is to determine the visibility of creating operationally polymer nanocomposite films for sensor and light emitting applications using the innovative modified double pulse laser deposition (DPLD) for host and dopant. The existing pulse laser deposition vacuum chamber has been modified to accommodate two laser beams of contrasting wavelengths for the situ ablation of two targets: a polymer host and a rare Earth-based highly efficient up conversion emitting inorganic dopant. Nanocomposite films of acrylic polymer and of the compounds of the rare Earth elements were fabricated by the proposed method with near-infrared (NIR) laser radiation (1064-nm wavelength) ablating the polymer targets and visible radiation (532-nm wavelength) ablating the inorganic targets. The devised nanocomposite films were characterized using X-ray diffraction (XRD), atomic force microscopy (AFM), ultra-violet visible optical absorption spectroscopy, and reflected high energy electron diffraction (RHEED). It was revealed that the produced polymer nanocomposite films maintained the crystalline structure and the up conversion fluorescence properties of the initial rare Earth-compounds mainly due to the preferred control of the deposition process of the materials with essentially different properties. The prospective method can be potentially used for making a wide variety of composite films.

## Biography

Abdalla M Darwish is a Professor of Physics and was recently named Dillard University's first Presidential Professor. He also holds Ruth Simmons University Distinguished Professor position. He obtained his BS in Nuclear Engineering from University of Alexandria, MS in Solid State Physics and PhD in Optics and Laser Physics from the University of Alabama in Tuscaloosa. Then, he joined Alabama A & M University in 1993 where he supervised 7 graduate students (5 MS and 2 PhD). He has been a Dillard University faculty member since 1998 and has served the university in numerous administrative roles, including Chair of the Physics Department, Chair of the School of Stem, Interim Dean of the College of Arts and Sciences, and Associate Provost and Associate Vice President for Academic Affairs. He is an expert in thin film fabrication using the MAPLE and Pulse Laser Deposition techniques. He has authored over 86 publications in the areas of non-linear optical materials, magnetic resonance, waveguides, thin film fabrication and optical sensors. Over the course of his tenure at Dillard, he has been able to secure over $15 million in grant funds as a PI or CoPI to establish many programs and research enterprises in physics and the School of Stem. He is in the process of filing six patents which change the way the pulsed laser deposition of materials is done around the world. In addition, he holds a public office where he has been serving as member of city of Kenner civil service board since its inception in 2007. He was awarded the Monte Lemann Award from the Civil Service League of the State of LA in Oct 2014.

adarwish@dillard.edu

**Notes:**