Dave H A Blank, J Nanomed Nanotechnol 2014, 5:5
http://dx.doi.org/10.4172/2157-7439.S1.017

OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference on
Nanotek & Expo

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Materials control on a nanoscale: Artificial oxide structures

Dave H A Blank
University of Twente, Netherlands

In general, nanotechnology provides the tools for controlling key parameters for thin films performance: Chemical composition (and crystalline structure at nano-sized domains), thickness and topography (including nano-scale patterning of thin films' surface) and controlled interfaces at the nanoscale. As research in nanotechnology develops, new characterization and production tools, new materials and process models as well as more computational power will become available. Pulsed Laser Deposition (PLD) is one of the attractive research tools for complex materials because it is fast and one can easily investigate a wide range of different materials and compositions. Much effort is put in the deposition of excellent textured layers without grain boundaries. In general the properties of highly oriented films approximate the properties of single crystals. Single or multi-layer structures require a well-conditioned process technique. The deposited layers must have a large homogeneity with well-defined material properties, smooth surfaces, and, in the case of oxides, the correct oxygen stoichiometry. Important is the possibility to combine PLD with standard *in-situ* diagnostic techniques, like high pressure Reflecting High Energy Electron Diffraction (RHEED). With the development of pulsed laser deposition with control at atomic level we are able to control the growth of complex materials and to introduce new growth manipulations, like pulsed laser interval deposition. At present, new superlattices can be synthesized that exhibit rare properties, like multiferroics. Extremely sharp and homogeneous interfaces can be realized and this is, for example, yet utilized in $SrTiO_3$-$LaAlO_3$ interfaces and artificial ferroelectric structures. Here, the author presents this unique technique and their use in obtaining complex materials systems 'on demand'.

Biography

Dave H A Blank has completed his PhD in 1991 at University of Twente on "High Temperature Superconductors". He is scientific director of MESA+ Institute for Nanotechnology, University of Twente and chair of the Dutch Nano-initiative NanoNextNL. He has published over 300 papers in refereed journals and supervised 38 PhD-students. He is founder of three start-ups originated from his research group.

D.H.A.Blank@utwente.nl