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Prospects of OLED Technology

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OLED commercialization has been led in mobile market by Samsung since 2007, but more suppliers in Korea, China and Japan are joining the market. However, there remain some challenges in expanding its application to large size TV and flexible displays, especially in competition with dominant LCD products. This talk will discuss future prospects of the OLED technology after brief review of the progress.

Keywords: OLED display, flexible, TV

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Nano Bio Imaging for NT and BT

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Understanding interfacial phenomena has been one of the main research issues not only in semiconductors but only in life sciences. I have been trying to meet the atomic scale surface and interface analysis challenges from semiconductor industries and furthermore to extend the application scope to biomedical areas. Optical imaging has been most widely and successfully used for biomedical imaging but complementary ion beam imaging techniques based on mass spectrometry and ion scattering can provide more detailed molecular specific and nanoscale information

In this presentation, I will review the 27 years history of medium energy ion scattering (MEIS) development at KRISS and DGIST for nanoanalysis. A electrostatic MEIS system constructed at KRISS after the FOM, Netherland design had been successfully applied for the gate oxide analysis and quantitative surface analysis. Recently, we developed time-of-flight (TOF) MEIS system, for the first time in the world. With TOF-MEIS, we reported quantitative compositional profiling with single atomic layer resolution for 0.5~3 nm CdSe/ZnS conjugated QDs and ultra shallow junctions and FINFET's of As implanted Si. With this new TOF-MEIS nano analysis technique, details of nano-structured materials could be measured quantitatively. Progresses in TOF-MEIS analysis in various nano & bio technology will be discussed.

For last 10 years, I have been trying to develop multimodal nanobio imaging techniques for cardiovascular and brain tissues. Firstly, in atherosclerotic plaque imaging, using, coherent anti-stokes raman scattering (CARS) and time-of-flight secondary ion mass spectrometry (TOF-SIMS) multimodal analysis showed that increased cholesterol palmitate may contribute to the formation of a necrotic core by increasing cell death. Secondly, surface plasmon resonance imaging ellipsometry (SPRIE) was developed for cell biointerface imaging of cell adhesion, migration, and infiltration dynamics for HUVEC, CASMC, and T cells. Thirdly, we developed an ambient mass spectrometric imaging system for live cells and tissues. Preliminary results on mouse brain hippocampus and hypothalamus will be presented.

In conclusions, multimodal optical and mass spectrometric imaging provides overall structural and morphological information with complementary molecular specific information, which can be a useful methodology for biomedical studies. Future challenges in optical and mass spectrometric imaging for new biomedical applications will be discussed.

Keywords: nano biochemical imaging