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 Abstract- MS Final Presentation

AFM Evaluation of Corrugated Substrates for Enhancing Light Outcoupling from OLEDs

Fabrication of OLEDs on nano-patterned plastic substrates is a novel approach for enhancing their forward light extraction. Such substrates are fabricated by MicroContinuum, Inc. (MCI), a collaborator on a project aimed at enhancing light outcoupling from OLEDs, which is a key scientific and technological challenge. Tapping mode Atomic Force Microscopy (AFM) was used for imaging various nano-arrays on which OLEDs were fabricated to determine the optimal pattern for enhancing light extraction. AFM images, via Nano scope software, provided information regarding the height and pitch of the nano-features, the structure quality, as well as the nature of the patterns, whether concave or convex. OLED fabrication on some of the patterned substrates resulted in enhanced light extraction however results were occasionally irreproducible, in some cases even when using the same substrate. The AFM was used to assess the origin of these issues by imaging 4’’x4” substrates at various locations to identify areas of problem, whether at specific or random locations. This mapping revealed structural damage in some areas, and occasionally the features’ height varied among different regions within the same substrate. The systematic mapping points to potential issues with MCI’s imprint tooling, process, and/or handling of the substrates, which is valuable for improving these promising substrates.