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## Self-alignment of Conductive Micro-sphere for Stretchable Micro LED

Ho Won Yoon<sup>1</sup>, Jae Byung Park<sup>1</sup>, and MunPyo Hong<sup>1</sup>

<sup>1</sup>Korea University, Korea, Republic of

Stretchable display is attracting great attention due to wide broad applications by its high degrees of freedom in shape. Stretchable Micro LED is considered to have advantage on energy efficient, high resolution, long life time and expected to solve OLED dependence. However it has to overcome mass production, transfer and printing, and high cost manufacturing issues. Dielectrophoresis is advanced technology controlling nano-sized or/and micro-sized particles. Due to its trapping, focusing, separating, sorting functions without physical damage or contamination, dielectrophoresis is widely used in biotechnology and medical engineering. MicroLED also can be self-aligned by using dielectrophoresis.

In this experiment, before adopting dielectrophoresis on micro LED, conductive micro-sphere is used instead due to low cost and high uniform characteristics. We have prepared dielectrophoretic device containing 18 spots to collect 18 spheres. Device cell is consisted of MIM device at the bottom and the elastomer on the top. The elastomer has approximately 100um height columns and forms 100um height inner channel with bottom substrate. Spheres are dispersed in the silicone oil and injected into the inlet formed at the elastomer and flow out through outlet. During silicone oil injection, non-uniform electric field is applied on the 18 spots by geometrical configuration of electrodes. Positive dielectrophoretic force, which attracts particle to stronger non-uniform electric field, acts on the conductive micro-sphere dispersed in the silicone oil and trap on the spot. If for any reason unwanted alignment result is obtained, it can be simply removed by turning off voltage and let them wash out into the flowing fluid.

In this sense, Micro LED is expected to be precisely and comfortably aligned by dielectrophoresis and it will be conducted in future work.

This work was supported by the Future Growth Engine Program (10079974, Development of core technologies on materials, devices, and processes for TFT backplane and light emitting front plane with enhanced stretchability above 20% with application to stretchable display) funded By the Ministry of Trade, Industry & Energy (MOTIE, Korea)