

Fabrication and Micro-Patterning of Conducting Polymer for Polymer Electronic Device

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Polymer Electronic Device를 제작하기 위해 전도성 고분자인 Poly (3,4-ethyldioxy thiophene)(PEDOT)을 자기 조립방식 중 하나인 기상 중합법을 이용하여 Plastic기판 위에 증착하였다. 기상 중합으로 제조된 PEDOT 박막은 높은 전기전도도 (100ohm/sq)와 우수한 광 투과도 (85%), 그리고 대기 중, 열적으로 안정한 특성을 보였다. 그리고 이러한 All-Polymer based Device를 제작하기 위한 PEDOT의 선택적 증착은 Photo-lithography를 이용하여 제조하였으며 이것은 산화제와 UV 파장의 빛을 반응시킴으로써 최소 10um까지 패턴된 PEDOT 박막을 제조할 수 있었다. 또한 본 실험에서는 기상중합법과 Photo-lithography를 이용하여 All-Polymer based Device를 구현하기 위해 Organic FET을 제조하였으며 이것은 Plastic 기판위에 각 층을 모두 전도성 고분자로 증착하여 제조하였다. 그리고 이렇게 제조된 Organic FET에 소자로써의 가능성을 확인하기 위해 전기적(I-V)특성을 측정하였으며 이것은 Polymer Electronic Device로의 충분한 응용 가능성을 보였다.

Keywords: Polymer Electronic Device, 전도성 고분자, PEDOT, 기상 중합

The Study of Reproduction Ni Mold for Imprinting by Self Assembled Monolayer Method

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Nanoimprint lithography (NIL) is the alternative method to transcribe a pattern on substrate by physical contact between mold and substrate. NIL offers a sub-10 nm feature size, high throughput, and low cost. Molds, apparatuses for imprinting and anti-adhesion layers are important factors to form the patterns on substrate successfully. Mold which has various patterns is the most important factor in NIL. There are some kinds of mold for NIL. Si and Ni mold are the most popular materials for NIL. Si is well known material so it is easy to make patterns by using conventional lithography. However, Si mold is too weak and it is easy to broken. Ni mold is developed to overcome because Ni mold is stronger than Si mold. Ni mold is made by electroplating on Si mold. Electroplated sample is dipping in KOH to remove Si mold. Si mold is etched and then finally only Ni mold is remained. This conventional method needs to consume a Si mold to make a Ni mold.

In this study, Ni mold was made without Si mold consumption by using hydrophobic layer. Hydrophobic layer was used for anti-adhesion layer to separate Ni mold and Si mold. Hydrophobic layer is formed with vapor SAM (self assembled monolayer) method. It is possible to make many Ni mold from one Si mold to use developed method.

Keywords: Nanoimprint lithography (NIL), electroplating, mold, SAM