

Abstract:

The intensive research in the area of organic semiconductors indicates a field of new electronic applications at low performance and low costs. In future applications of the organic materials as printed rfid-labels or mechanical flexible displays are conceivable. For a cheap production these electronics should be produced e.g. by printing technology in roll-to-roll production.

In this work an integration technique for organic field-effect transistors (ofets) with pentacene has been developed as a basic element for electronics on mechanical flexible substrates, e.g. PET-films. The polymer films benefit from their explicit lower price in comparison to standard silicon substrates. Because of the mechanical elasticity of the plastic substrates a flexible gate dielectric layer is needed, too. In parallel these films must have a smooth surface, and the surface energy should improve the crystalline order of the pentacene molecules during the deposition process to insure that ofets can reach sufficient quality. Polyimides, high-k organic dielectric layers and commercial insulating films have been analysed .

Besides the manufacturing of ofets first promising inverter structures were integrated. They posses both a good logic high level and a good logic low level. Moreover the inverters show an amplification of more than 5.5.