

MATERIALS SCIENCE AND ENGINEERING SEMINAR

“Study of the Growth of Pentacene for Organic Transistors”

by

Shu-han Hsu
Purdue MSE Prelim 1
Advisor: Professor Michael Manfra

ABSTRACT

Since the breakthrough of conducting polymers in the 1970 and the development of organic light-emitting diodes in the 1980, organic electronics have become a rapidly developing new field. Compared to silicon and III-V devices, organic devices such as solar cells, displays and sensors, etc., can be fabricated that have the potential for low cost production, easy fabrication, and the ability to be integrated into flexible devices. Despite the excitement, in order for them to have practical uses, organic field effect transistors, or organic transistors for short, are needed to control these devices. The main parameters to characterize an organic transistor are mobility, operating voltage, and on/off ratio. However, the performance of organic transistors is poor compared to their inorganic counterparts. Therefore, it is important to know the influence of the materials properties on the electrical characteristics in organic transistors for improvement.

This review will focus on the growth of pentacene as the semiconducting layer for organic transistors. Various deposition conditions will be compared that lead to different pentacene phases, along with their effects on the mobility of the organic transistors. The influence of dielectric layer interface on electrical properties will also be discussed. Microstructural characterization analysis that will lead to a deeper understanding of how the materials properties affect the transistor performance will also be proposed.

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