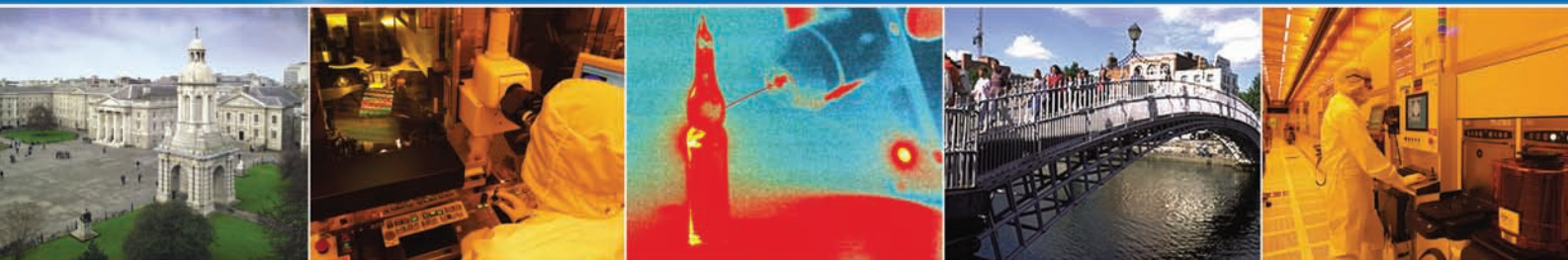


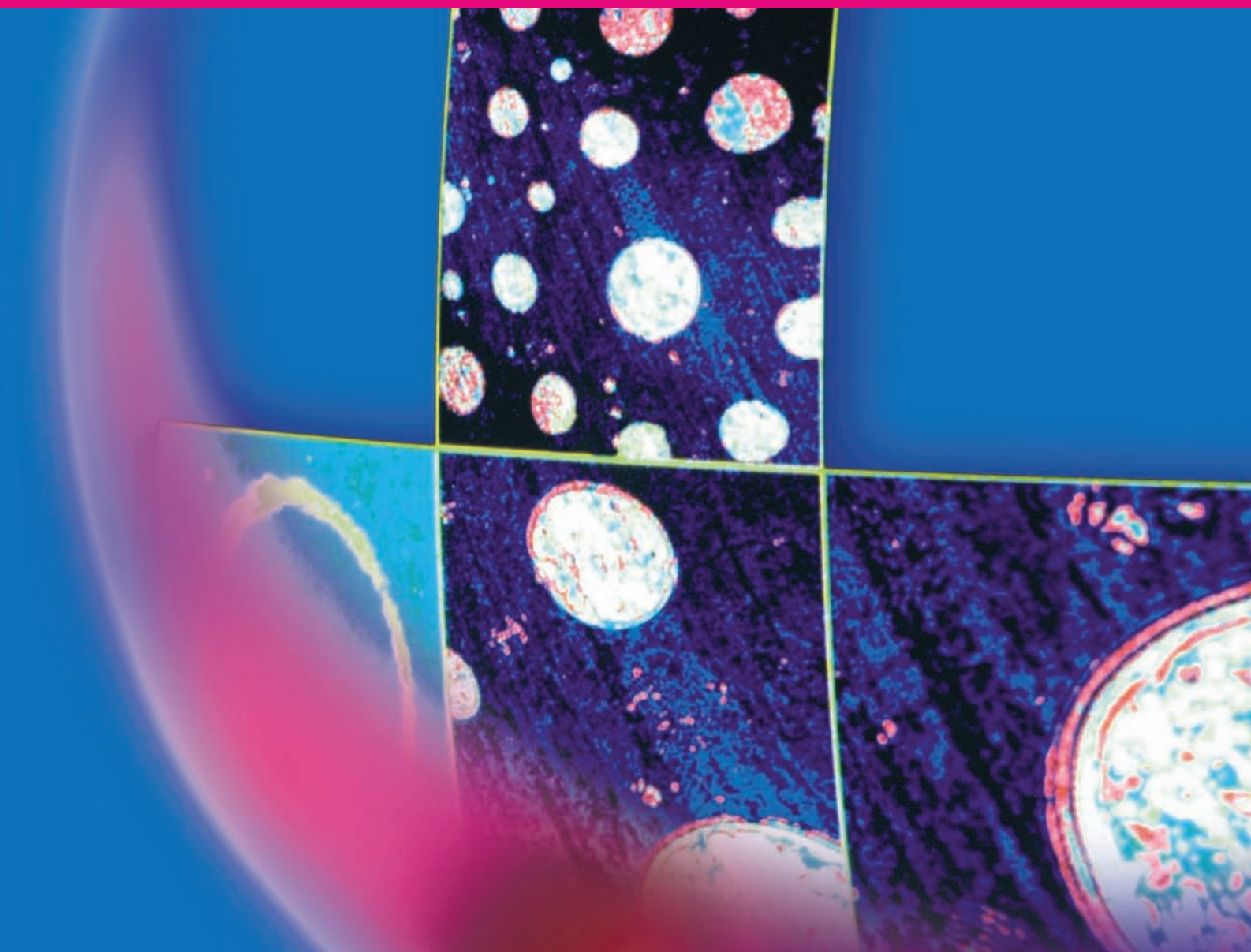
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Characteristics Of Organic Thin Film Transistor (OTFT) Using PEDOT Electrodes And Insulating Polymer

H. S. Kang, J. W. Lee, M. K. Kim, and J. Joo

Department of Physics, Korea University, Seoul, 136-713, Korea

J. M. Ko and J. Y. Lee

School of Applied Chemistry and Chemical Engineering, Sungkyunkwan University, 300 Chunchun-Dong, Jangan-Gu, Suwon 440-746, Korea

We fabricated organic pentacene based thin film transistor using poly (3,4-ethylenedioxythiophene) (PEDOT) electrodes and poly (vinyl cinnamate) (PVCN) insulating layer. The current-voltage characteristic curves of the organic thin film transistor (OTFT) using PEDOT electrodes showed typical p -type device [Fig. 1 (a)]. We also fabricated pentacene based OTFT with Au electrodes and SiO_2 insulating layer. The electrical characteristics of the devices such as carrier mobility (μ), current on-off ratio ($I_{\text{ON/OFF}}$), and threshold voltage (V_{TH}) were compared for both devices. The both devices had similar carrier mobilities of $\sim 2 \times 10^{-3} \text{ cm}^2/\text{Vs}$ even though the conductivity of PEDOT is much lower than Au. The $I_{\text{ON/OFF}}$ were ~ 100 and ~ 10000 , and V_{TH} were 4 V and 10 V for the devices with PEDOT electrodes and Au electrodes, respectively. The activation energies of both devices were obtained from the temperature dependence of carrier mobility using the multi-trap and released (MTR) model. The activation energy of the devices with PEDOT electrodes was 0.33 eV, which is higher than that (0.13 eV) of the devices with Au electrodes, as shown in Fig. 1 (b). It is noted that the carrier mobilities of both devices were almost the same even the lower conductivity of PEDOT electrodes and higher activation energy in the OTFT using PEDOT electrodes. We suggest that the lower contact barrier between PEDOT electrodes and pentacene active layer should provide the easy charge injection with the better performance of the devices.

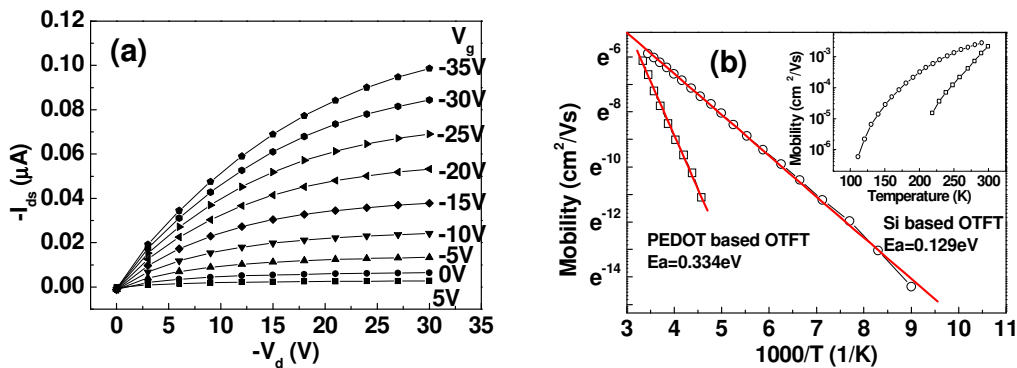


Figure 1. (a) I-V characteristic curve of the OTFT using PEDOT electrodes and (b) Arrhenius plot of the mobilities of the both devices. Inset: temperature dependent mobilities in logarithmic scale.