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Organic semiconducting nanofibers for electrical and medical applications.

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We fabricate nanofibers that consist of poly(3-hexylthiophene)(P3HT) and polystyrene (PS) by electrospinning. In this process, we optimized the various electrospinning conditions such as solvent concentration (using co-solvent of chloroform and chlorobenzene), P3HT concentration, applied voltage, distance between the nozzle and collector, and temperature. At a certain composition of co-solvent condition (4:1 (v/v) chloroform:chlorobenzene), P3HT-PS blend nanofibers were uniformly formed at high voltage (15 kV). The electrospun nanofibers were directly deposited on the gold electrodes to be tested for the field effect transistor (FET). Electrical characteristics of thus prepared FET were measured under the ambient condition. It was found that the mobility value increases as the initial P3HT concentration increases. However, P3HT nanowire without PS was not obtainable with electrospining. The solubility of P3HT-PS in co-solvent prior to the electrospinning was also important to achieve the consistent results. Towards the future research,we expect that P3HT-PS nanowire may be used in medical sensors in a simple and cheap process..

References

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