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第290回 未来化学創造センターセミナー



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Dr. Soumya Dutta

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“Microelectronics-Compatible Soft Material-based Devices:
Science and Technology”

Dr. Jayeeta Bhattacharyya,

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“Electroabsorption spectroscopy of organic
semiconductors: probing the nature of excitons”

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Microelectronics-Compatible Soft Material-based Devices: Science and Technology / Dr. Soumya Dutta

The fate of any device technology highly depends on the feasibility of scalable batch-processing. In most of the traditional on-chip device technologies, microelectronic technology involving photolithography, etching, etc. has been considered an indispensable route for fabrication towards miniaturization. This eventually reduces the production cost due to availing scalability, speed, and volume production. However, the implementation of photolithography directly on the soft materials, which are essential candidates for flexible electronics, is not straightforward due to incompatibility. Our research group has been actively devoted to the development of various electronic devices using solution-based soft materials like polymer dielectrics, polymer piezoelectric materials, reduced graphene oxide (rGO), etc. and by adapting microelectronic technology to realize miniaturized high-resolution device structures. The first portion of this talk will disclose the methodology to address these challenges in general to realize polymer-based surface acoustic wave (SAW) devices and rGO-based nanoelectromechanical system (NEMS) devices for sensing applications. The second portion will cover the impact of the contact-induced phenomena in organic field-effect devices for circuit implementation.

Electroabsorption spectroscopy of organic semiconductors: probing the nature of excitons / Dr. Jayeeta Bhattacharyya

In electroabsorption spectroscopy, the change in the absorption of the sample due to an external electric field is measured. This modulation measurement gives information about the nature of excitons and the electric fields within the active layer in which the absorption takes place. From analysis of the EA spectrum, the nature of the contributing exciton, whether Frenkel, or CT or mixed, can be estimated. This talk will focus on our work on electroabsorption studies in organic semiconductor films. Lineshape analysis and the influence of interference on the derived parameters will also be discussed.