

Abstract Submitted
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Separation of Carrier-Transport and Light-Emission Functions in a Light-Emitting Organic Transistor with Bilayer Configuration HUI SHANG, HIDEKAZU SHIMOTANI, Department of Physics, Tohoku University, Japan, KANAGASEKARAN THANGAVEL, KATSUMI TANIGAKI, WPI-AIMAR, Tohoku University, Japan, NANO SOLID STATE PHYSICS TEAM — Organic single crystal based ambipolar light-emitting field effect transistors is treated as the candidate to realize laser. However, the active layer should contain both superb luminescent property and high charge-carrier mobility, which are always competing with each other in one material. Our basic concept for solving this problem is divide these two factors into two layers, and the combination of these two layers acts as the active layer of LEFET Bottom layer with high carrier mobility can be assigned as carrier transporter, and top layer with high PL efficiency was assigned as light emitter. After injection, the carriers will have a recombination in the bottom layer and formed exciton will transfer into the top layer with light emission. In this work, we have fabricated bilayer structure device, in which tetracene was used as bottom crystal and 4-(dicyanomethylene)-2-methyl-6-(p-dimethylaminostyryl)-4H-pyran (DCM) doped tetracene was laminated on tetracene as light emitter. We have successfully observed light emission from top crystal, from which our aforementioned hypothesis was preliminary proved. Details will be reported in the presentation.

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