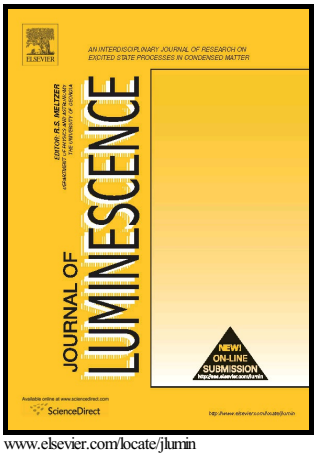

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A Wide-Energy-Gap Naphthalene-Based Liquid Organic Semiconductor Host for Liquid Deep-Blue Organic Light-Emitting Diodes

Naofumi Kobayashi[a1], Hiroyuki Kuwae[a1], Juro Oshima[b], Ryoichi Ishimatsu[c], Shuya Tashiro[c], Toshihiko Imato[c], Chihaya Adachi[d], Shuichi Shoji[a], Jun Mizuno[e,*]

[a]Faculty of Science and Engineering, Waseda University, 3-4-1 Okubo, Shinjuku, Tokyo, 169-8555, Japan.
[b]Frontier Materials Research Department, Materials Research Laboratories, Nissan Chemical Industries, Ltd., 488-6 Suzumi-cho, Funabashi, Chiba, 274-0052, Japan
[c]Department of Applied Chemistry, Graduate School of Engineering, Kyushu University, 744 Motooka, Nishi, Fukuoka, 819-0395, Japan
[d]Center for Organic Photonics and Electronics Research (OPERA), Kyushu University, 744 Motooka, Nishi, Fukuoka 819-0395, Japan.
[e]Research Organization for Nano and Life innovation, Waseda University, 513 Waseda Tsurumaki-cho, Shinjuku, Tokyo 162-0041, Japan.

[*]Authors to whom correspondence should be addressed. E-mail: mizuno@waseda.jp.

Abstract

We developed a novel naphthalene derivative to function as a wide-energy-gap liquid organic semiconductor (LOS) host material for the limited range of liquid deep-blue light-emitting materials that have been developed to date. The naphthalene derivative 1-naphthaleneacetic acid 2-ethylhexyl ester (NLQ), which shows a low viscosity of 20 mPa· s at 25 °C, was synthesized as a LOS by introducing an ethylhexyl group into naphthalene. We doped 9,10-diphenylanthracene (DPA) into NLQ as a guest deep-blue dye. The highest occupied molecular orbital (HOMO) energy level of NLQ was estimated to be -6.40 eV from photoelectron spectroscopy measurements in air. The energy gap of NLQ was estimated to be 4.08 eV from its absorption spectrum, indicating that NLQ has the widest energy gap of any such host material to date. The

[1] N. Kobayashi and H. Kuwae contributed equally to this work.