Title (en)

SEMICONDUCTOR DEVICE STRUCTURE

Title (de)

HALBLEITERBAUELEMENTSTRUKTUR

Title (fr)

STRUCTURE DE DISPOSITIF À SEMI-CONDUCTEURS

Publication

EP 2115788 A2 20091111 (EN)

Application

EP 08715844 A 20080218

Priority

- EP 2008001248 W 20080218
- US 90174707 P 20070216

Abstract (en)

[origin: WO2008098797A2] The semiconductor device structure demonstrates a novel organic device concept, capitalizing on knowledge from both the photovoltaic cell and the field effect transistor. This hybrid "photo gated" detector comprises an inorganic capacitive layer, a molecular sensitizing layer and an organic charge transport layer, caped with in-plane gold electrodes defining an active channel. Under illumination, the sensitizer injects an electron in the capacitive layer, constituted by a wide band gap inorganic oxide of mesoscopic morphology, while the resulting positive charge is transferred to the hole- transporter. The increased hole density results in vastly enhanced film conductivity and charge carrier mobility. Strikingly high light/dark current ratios of up to 10⁶ at low temperature and 10⁴ at room temperature are observed corresponding to mobility enhancements of up to 10³. This not only presents a new method for estimating mobility in organic materials but also offers a broad range of sensing and memory applications.

IPC 8 full level

H01L 31/11 (2006.01); **H01L 51/44** (2006.01)

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Designated contracting state (EPC)

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