

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, capped 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  $10^{6-}$  at low temperature and  $10^{4-}$  at room temperature are observed corresponding to mobility enhancements of up to  $10^{3-}$ . 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)

CPC (source: EP)  
**H01L 31/09** (2013.01); **H01L 31/1129** (2013.01)

Citation (search report)  
See references of WO 2008098797A2

Designated contracting state (EPC)  
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