

**PATENT ASSIGNMENT**

Electronic Version v1.1  
 Stylesheet Version v1.1

<b>SUBMISSION TYPE:</b>		NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>		EXECUTIVE ORDER 9424, CONFIRMATORY LICENCE
<b>CONVEYING PARTY DATA</b>		
<b>Name</b>		<b>Execution Date</b>
Northwestern University		03/20/2007
<b>RECEIVING PARTY DATA</b>		
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<b>Property Type</b>	<b>Number</b>	
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## Inorganic-Organic Hybrid Thin-Film Transistors Using Inorganic Semiconducting Films

The United States Government has certain rights to this invention pursuant to Grant Nos. CHE-0201767 and NSF-DMR-00760097 from the National Science Foundation Grant No. NCC2-3163 from NASA and DARPA/ARO No. W911NF-05-1-0187, to Northwestern University

### Background of the Invention

Since the first field-effect device appeared in a 1934 patent issued to Lilienfeld, thin-film transistors (TFTs) have increasingly pervaded our daily life: they are an indispensable element in advanced electronic/photonic devices, such as wearable computers, cell phones, displays, and sensors. Particularly, the demand for next-generation mobile computing and communication devices will heavily increase in the near future. Due to the required diverse multiple functionalities, ideal mobile devices must meet stringent criteria, such as high optical transparency, mechanical flexibility and ruggedness, long lifetime, and compatibility with diverse substrates, especially flexible plastic substrates. For practical applications, there are additional critical factors such as light weight, low power consumption, high output power, and adaptability to inexpensive fabrication techniques. High-performance TFTs meeting all aforementioned requirements are still presently elusive. Indeed, conventional inorganic TFTs based on inorganic semiconductors such as hydrogenated amorphous silicon (a-Si:H), polycrystalline silicon, and II-VI/III-V semiconductors, have limited application in the aforementioned areas due to either the poor optical transparency, low carrier mobilities, high operating voltages, lack of mechanical flexibility, incompatibility with large area deposition processes, or high-temperatures required for fabrication (usually > 400 °C). Alternatively, organic TFTs (OTFTs) have been extensively studied and can benefit from tailorable molecular functionality. Unfortunately, the intrinsic low field-effect mobilities of organic semiconductors hinders their use in many applications.

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Invention Title: Inorganic-Organic Hybrid Thin-Film Transistors Using Inorganic Semiconducting

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U.S. Filing/Issue Date: 12/20/2006

Patent or Application Serial No.: 11/642,217

Grant/Contract Number(s): DMR0076097, CHE0201767

: W911NF-05-1-0187

The invention identified above is a Subject Invention under **35 U.S.C. 200, et seq.**, and the Standard Patent Rights clause at **37 CFR 401.14, FAR 52.227-11** or **FAR 52.227-12** (if applicable) which are included among the terms of the above identified grant or contract award from the United State Government. This document is confirmatory of:

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Signed this 20th day of March, 2007.

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