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Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

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Michelle H. Lee

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US008981096B2

(12) **United States Patent**
Roy et al.

(10) **Patent No.:** **US 8,981,096 B2**
(45) **Date of Patent:** **Mar. 17, 2015**

(54) **NICKEL COMPLEXES FOR FLEXIBLE TRANSISTORS AND INVERTERS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 877 days.

(21) Appl. No.: **13/097,656**

(22) Filed: **Apr. 29, 2011**

(65) **Prior Publication Data**
US 2012/0276687 A1 Nov. 1, 2012

(51) **Int. Cl.**
C07D 241/38 (2006.01)
H01L 51/00 (2006.01)
H01L 51/05 (2006.01)

(52) **U.S. Cl.**
CPC **H01L 51/0084** (2013.01); **H01L 51/0051** (2013.01); **H01L 51/0533** (2013.01); **H01L 51/0558** (2013.01)
USPC **544/408**; 544/344; 546/257

(58) **Field of Classification Search**
CPC C07D 241/38
USPC 544/344, 408; 546/257
See application file for complete search history.

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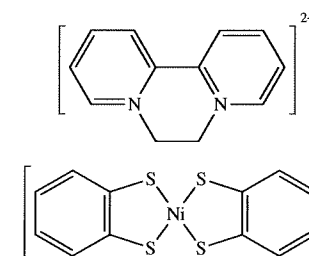
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(57) **ABSTRACT**

The design and synthesis of six nickel charge transfer (CT) complexes are described herein. The six nickel CT complexes have a nickel center, two organic ligands coordinated with the nickel center to form a dianionic square planar supramolecule and an organic counter-cation as represented by



The ligands and counter-cations are selected to optimize properties, such as molecular alignment, film morphology, and molecular packaging. Described herein, the ligands can be 2,3-pyrazinedithiol (L1), 1,2-benzenedithiol (L2) or 2,3-quinoxalinedithiol (L3) and the counter-cations can be diquat (2,2'-ebpy) or methyl viologen (4,4'-mbpy). The six nickel CT complexes can also be utilized semiconductor devices, such as thin film transistors or inverters. Processes are also provided for the fabrication of semiconductor devices. The processes can include fabricating a substrate with a bilayer octadecylphosphonic acid (ODPA)/Al2O3 dielectric and applying one of the six nickel charge transfer (CT) complexes to the substrate.

4 Claims, 18 Drawing Sheets

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If the application for this patent was filed on or after December 12, 1980, maintenance fees are due three years and six months, seven years and six months, and eleven years and six months after the date of this grant, or within a grace period of six months thereafter upon payment of a surcharge as provided by law. The amount, number and timing of the maintenance fees required may be changed by law or regulation. Unless payment of the applicable maintenance fee is received in the United States Patent and Trademark Office on or before the date the fee is due or within a grace period of six months thereafter, the patent will expire as of the end of such grace period.

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If the application for this patent was filed on or after June 8, 1995, the term of this patent begins on the date on which this patent issues and ends twenty years from the filing date of the application or, if the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121, or 365(c), twenty years from the filing date of the earliest such application ("the twenty-year term"), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b), and any extension as provided by 35 U.S.C. 154(b) or 156 or any disclaimer under 35 U.S.C. 253.

If this application was filed prior to June 8, 1995, the term of this patent begins on the date on which this patent issues and ends on the later of seventeen years from the date of the grant of this patent or the twenty-year term set forth above for patents resulting from applications filed on or after June 8, 1995, subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b) and any extension as provided by 35 U.S.C. 156 or any disclaimer under 35 U.S.C. 253.