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Homoleptic tricyclicmetalated iridium(III) complexes based on highly luminescent 2,4-diarylsubstituted quinolines containing 4-fluorophenylvinyl moieties: Potential materials for organic light emitting diodes (OLEDs)

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In the present work, four new series of highly luminescent cationic homoleptic iridium (III) cyclometalated complexes of the type $[\text{Ir}(\text{NAC})_3]\text{PF}_6$ based on derivatives of 4-fluoro-phenylvinylquinolines containing electron donating and withdrawing groups as aryl-substituents at 2-position of the quinoline scaffold were synthesized and characterized. While the ligands were initially prepared via palladium catalyzed Suzuki-Miyaura cross-coupling of the 2-aryl-4-chloroquinoline, cyclometalation of Ir(III) complex is accomplished in one-pot reaction method. The spectroscopic and photophysical properties of the compounds were determined using FT-IR, NMR, UV-Vis absorption, PL spectroscopy. Strong singlet metal-to-ligand charge transfer (¹MLCT) absorption peaks were found between 338-410 nm in methanol. The photoluminescence properties of the ligands measured in solvents of different polarity were tuned by modification with wavelengths displaying a red-shift emission from 440-490 nm when compared to 480-550 nm in the complexes, and maximum enhanced fluorescence intensities and high quantum yield observed in chloroform and methanol unlike in dimethylformamide (DMF), suggesting the intramolecular charge transfer (ICT) character of the emission state. Electrochemical properties show the complexes to be redox-active in nature. The high emission intensity of the complexes endear them to be applied as new materials in the area of OLEDs, temperature and oxygen sensors.

Biography

Adewale O Adelaye received a BSc (Hons.) degree Chemistry from the Ondo State University, Ado-Ekiti, Nigeria, 1994. He proceeded to study Pharmaceutical Chemistry at the Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife, Nigeria, where he bagged a Master of Science (Pharmaceutical Chemistry) degree in 2001. While working as an Organic Chemistry Lecturer at the Obafemi Awolowo University, Ile-Ife (2003-2012), he successfully completed a Master of Philosophy degree in Chemistry (2008) with specialization in the natural products isolation and characterization. Due to the incessant electricity power challenge faced in Nigeria, he developed interest in the renewable energy (Solar Cells) research, most especially in the dye-sensitized solar cells (DSSCs). He registered for a Doctoral study at the University of Fort Hare, Alice, South Africa in 2008. He completed his research work and was awarded a PhD Degree in Chemistry in 2011. He has 26 published articles in peer-reviewed accredited journals to his credit with an appreciable number of citation volumes. He has worked as a Postdoctoral research fellow at two different universities in South Africa and he is currently a Senior Researcher (Natural Resources and Materials) at the Botswana Institute for Technology and Innovation (BITRI), Gaborone, Botswana.

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3D Nanomaterials for high performance electrodes

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We present here the production of nanostructured metal electrode coatings with a unique "bicontinuous cubic" nano-architecture. These are produced through electroplating within soft templates formed by self-assembly of low-cost plant-derived surfactants. The metal adopts novel ordered 3-D nanowire network structures, with tuneable size scale on the order of tens of nanometres. This results in an increase in electrode surface area by a factor of over a 1,200, with applications in sensors, batteries, fuel cells and solar cells. The process is low-cost, industrially scaleable and uses chemically mild, environmentally friendly conditions, while the continuous morphology avoids many of the problems associated with the use of nanoparticles.

Biography

A M Squires completed his Masters at Oxford University in department of Chemistry, his Ph.D at Imperial College, London and his postdoctoral studies at Cambridge University (Cavendish Laboratory). He has published more than 35 papers in reputed journals, and has an h-index of 13.

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