Photophysically Innocent Boron Cluster Ligand Scaffolds For Organic Light Emitting Diode Materials

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SUMMARY

UCLA researchers have developed a novel method to using boron clusters ligands for light emitting diode materials. This is the first report of the ligand 1,1'-bis-o-carborane (bc) bound to Pt(N^N). Both C-Pt symmetrical isomers and C-Pt/B-Pt asymmetric isomers can be synthesized.

BACKGROUND

An organic light- emitting diode (OLED) is aLED in which the emissive electroluminescent layer is a film of organic compound that emits light in response to an electric current. OLEDs have shortened lifetimes due to reasons such as ligand aggregation and lack of steric bulk. blue OLEDs have short lifetimes vs red and green partly because the higher energy blue light makes it difficult to design stable deep-blue emitters. Intermolecular aggregation and a lack of steric bulk are fundamental issues that must be addressed with the Pt(II) phosphorescent emitters. This innovation is the synthesis and characterization of a new complex that reduces these undesired intermolecular (Pt···Pt) interactions. Blue emission is achieved with a fluoride-free framework. No technology exists that uses Boron Clusters with 1,1'-bis-o-carborane (bc) in OLED and photoemission applications. By decreasing the undesired interactions the result is for increased bulk and more stable and tunable transition phase stability.

INNOVATION

- Synthesis and characterization of a new complex that uses a carborane
- 1,1'-bis-o-carborane (bc) boron derivative
- Using bc in place of the commonly used biphenyl layer in OLED applications
- Reduce Pt···Pt interaction and aggregation
- Can increase bulk and more stable and tunable transition phase stability

APPLICATIONS

- OLED
- Solid state applications
- Luminescent materials
- TV Screens
- Cell Phone Screens
- Electronic devices with displays
- Car screens
- GPS
- Gaming consoles
- Monitors
- Lighting
- Car tail lights and interior lighting

ADVANTAGES

- Blue emission is achieved with a fluoride-free framework
- 1,1'-bis-o-carborane (bc) boron derivative:
- Boron cluster ligand scaffold
- Light emitting properties

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OTHER INFORMATION

KEYWORDS

Carbonares, OLED, boron cluster, blue wavelength, emission, 1,1'-bis-o-carborane, square planar platinum complexes, phosphorescent emitters, solid-state emissions, light emitting diodes,

CATEGORIZED AS

- Optics and Photonics
- All Optics and Photonics

RELATED CASES

2016-573-0

- Blue wavelength (maximum emission at 463 nm)
- Decreased degradation
- Increases OLED efficiency and lifetime
- Increased Blue OLED efficiency
- Bulky Pt(II) platform
- Strong ligand field
- Large band gap for blue emission
- Increased transition state stability yielding greater color purity and range
- This innovation decreases undesired Pt···Pt interactions yielding more Pt available in bulk

STATE OF DEVELOPMENT

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,479,470	10/25/2022	2016-573

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