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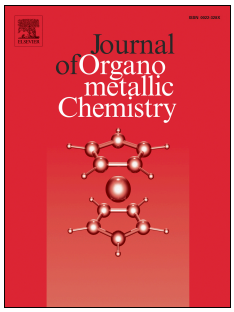

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Luminescent Ir(III) complexes bearing benzothiazole or benzoxazole-based pincer ligand

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ABSTRACT

Ir complexes bearing pincer ligands are expected to be efficient phosphorescent materials. This work investigated the solid-state structures and photophysical properties of Ir(III) complexes that contain different NCN pincer ligands (NCN = 1,3-bis(2-benzothiazolyl)benzene, 1,3-bis(2-benzoxazoyl)benzene, or 1,3-bis(2-benzimidazoyl)benzene derivatives), bidentate cyclometalating NC ligands (NC = 2-phenylpyridine or 2-phenylbenzothiazole), and anionic ancillary ligands. The structure of the NCN pincer ligands is a dominant factor for determining the emission wavelength, rather than the bidentate NC and ancillary ligands. The organic light emitting diodes (OLEDs) with an Ir(III) complex show electroluminescence with 14% external quantum efficiency at 1 $mAcm^{-2}$. Modification of the device structure improved the efficiency at the high current density region.

Keywords: Pincer complex; Photoluminescence; Electroluminescence; Ir(III) complex; OLEDs.

1. Introduction

Cyclometalating tridentate ligands (so-called pincer ligands) provide high stability, unique catalytic activity, and efficient luminescent properties to transition-metal complexes [1–5]. Nitrogen-based NCN and CNN pincer ligands have been used to develop Pt complexes showing highly efficient phosphorescence [2,6]. Williams and Haga independently developed Ir complexes bearing NCN