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Author: Yan-Sheng Luo Jing-Lin Chen Xue-Hua Zeng Lu Qiu Li-Hua He Sui-Jun Liu He-Rui Wen

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Original article

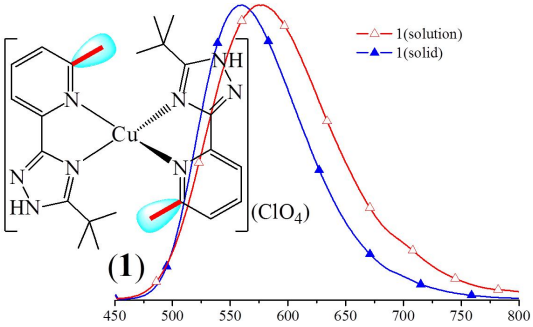
A highly stable and luminescent mononuclear Cu(I) bis-{5-*tert*-butyl-3-(6-methyl-2-pyridyl)-1*H*-1,2,4-triazole} complex

Yan-Sheng Luo, Jing-Lin Chen*, Xue-Hua Zeng, Lu Qiu, Li-Hua He, Sui-Jun Liu, He-Rui Wen

School of Metallurgy and Chemical Engineering, Jiangxi University of Science and Technology, Ganzhou 341000, China

* Corresponding author.
E-mail address: *gzchenjinglin@126.com*

Graphical Abstract



A new luminescent mononuclear Cu(I) bis-{5-*tert*-butyl-3-(6-methyl-2-pyridyl)-1*H*-1,2,4-triazole} complex has been synthesized and characterized. It is shown that the introduction of the methyl group at the *ortho*-position of the pyridyl ring is very important and helpful for improving the stability and luminescence properties of Cu(I) complexes.

ABSTRACT
A new emissive mononuclear homoleptic Cu(I) complex of 5-*tert*-butyl-3-(6-methyl-2-pyridyl)-1*H*-1,2,4-triazole (bmptzH), $[Cu(bmptzH)_2](ClO_4)$ (**1**), has been synthesized by treatment of $[Cu(PPh_3)_2(CH_3CN)_2](ClO_4)$ or $[Cu(CH_3CN)_4](ClO_4)$ with the bmptzH ligand. It is revealed that complex **1** displays a distorted N_4 tetrahedral arrangement formed by two bmptzH chelates, in which bmptzH adopts a neutral bidentate chelating coordination mode using the N atom of the pyridyl ring and the 4-N not 2-N atom of the 1,2,4-triazolyl ring. It is shown that complex **1** is highly stable and exhibits good luminescence properties in solution and solid states at room temperature due to the introduction of a methyl group at the *ortho*-position of the pyridyl ring.

Keywords:
Cu(I) complex
1,2,4-Triazole
6-Methyl-2-pyridyl
Luminescence
Crystal structure

1. Introduction

There has been a rapidly increasing interest in the fundamental properties of emissive transition metal complexes, because of their potential applications in organic light-emitting devices, light-emitting electrochemical cells, chemical sensors/probes, and biological