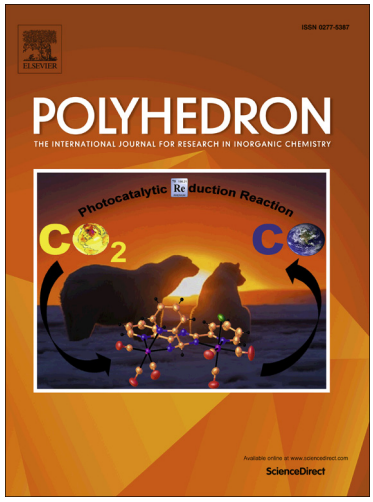

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Jonas Schönle, Edwin C. Constable, Catherine E. Housecroft, Alessandro Prescimone, Jennifer A. Zampese

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Homoleptic and heteroleptic complexes of chromium(III) containing 4'-diphenylamino-2,2':6',2''-terpyridine ligands

Jonas Schönle, Edwin C. Constable, Catherine E. Housecroft,* Alessandro Prescimone and Jennifer A. Zampese

Department of Chemistry, University of Basel, Spitalstrasse 51, 4056-Basel, Switzerland

Fax: +41 61 267 1018; E-mail: catherine.housecroft@unibas.ch

Abstract

Two heteroleptic bis(2,2':6',2"-terpyridine)chromium(III) complexes [Cr(**1**)(4'-(4-tolyl)tpy)][CF_3SO_3]$_3$ and [Cr(**2**)(4'-(4-tolyl)tpy)][CF_3SO_3]$_3$ (**1** = 4-([2,2':6',2"-terpyridin]-4'-yl)-N,N-diphenylaniline, **2** = 4-([2,2':6',2"-terpyridin]-4'-yl)-N,N-bis(4-methoxyphenyl)aniline, 4'-(4-tolyl)tpy = 4'-(4-tolyl)-2,2':6',2"-terpyridine) have been prepared and their spectroscopic and electrochemical properties compared with those of [Cr(4'-(4-tolyl)tpy)$_2$][CF_3SO_3]$_3$ and [Cr(**1**)$_2$][CF_3SO_3]$_3$. The single crystal structure of [Cr(4'-(4-tolyl)tpy)$_2$][CF_3SO_3]$_3$·2MeCN is presented, and the effects of accommodating three triflate anions and two MeCN molecules per cation are discussed in terms of related structures. The coordination of **1** or **2** to chromium(III) red-shifts the intra-ligand charge transfer (ILCT) band and this band exhibits a negative solvatochromic effect in some solvents. However, in H_2O, MeOH, DMSO and DMF, the tpy ligands are labile; changes in the absorption spectra of solutions of [Cr(**2**)(4'-(4-tolyl)tpy)][CF_3SO_3]$_3$ are consistent with the formation of $[Cr(4'\text{-}Xtpy)(Solv)_3]^{3+}$ (Solv = solvent) rather than complete ligand displacement or a ligand redistribution.

Keywords: Chromium(III); 2,2':6',2"-terpyridine; solvatochromic; absorption spectra; heteroleptic complex