

Área: INORGÂNICA**Development of Platinum(II) Metalomesogens for Anisotropic Phosphorescent Emission**André Ferrarini (PG),¹ Monike da Silva Kutz (PG),¹ Carolina Francener (PG),² Eduard Westphal (PQ)^{1*}

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¹Chemistry Department, UFSC; ² Chemistry Department, Durham UniversityPalavras Chave: *Platinum(II) complexes, Salophen ligands, OLEDs, Liquid crystals, Photoluminescence, Anisotropic emission.***Highlights**

Molecular design and synthesis of new platinum(II) salophen complexes targeting efficient red emission and liquid-crystalline properties for application in high-performance OLED devices.

Resumo/Abstract

Platinum(II) complexes are well known for their luminescence and are widely used as red-emitting layers in OLEDs [1]. Salophen-based variants stand out for their easy synthesis and strong photoluminescence, with previous prototypes of OLED devices showing emission around 630 nm and EQE up to 9.4% [2]. This work focuses on designing liquid-crystalline salophen platinum(II) complexes to induce alignment in the emissive layer, which could boost EQE by up to 60% through anisotropic emission [3]. The complexes were obtained in two steps: ligand synthesis by imine condensation, followed by complexation with $K_2[PtCl_4]$ (Figure 1).

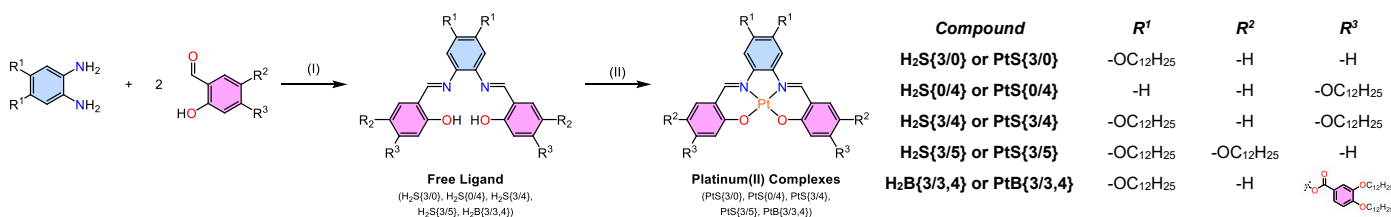


Figure 1 – Synthetic route for the platinum(II) salophen complexes; (I) EtOH or MeOH, reflux, Ar0(g), overnight; (II) $K_2[PtCl_4]$, DMSO:DMF (4:1), 70 °C, Ar0(g), overnight.

Thermal analysis shows that platinum(II) coordination increases melting and crystallization points (MP and CP, respectively), indicating greater rigidity. PtS{3/0} exhibits the largest MP and CP shift, followed by PtS{0/4} and PtB{3/3,4}, none of which display mesomorphic behavior. PtS{3/4} also lacks mesophases, melting below its free ligand and forming a supercooled liquid on cooling. Preliminary data for PtS{3/5} suggest a glass transition and a transient columnar mesophase upon first heating, which requires further investigation. Steady-state and time-resolved photoluminescence data indicate that all complexes exhibit phosphorescence between 580 and 640 nm (orange to red region). Pt{3/0} shows a red shift and shorter lifetime than Pt{0/4}, suggesting that substitution at R¹ hinders emission more than at R³. Pt{3/4} offers the best balance, with emission similar to Pt{3/0} and lifetime close to Pt{0/4}. New structures are currently being developed, aiming to stabilize mesomorphism, without impairing efficient emission.

References: [1] HONG, G.; GAN, X.; LEONHARDT, C. et al; Adv. Mater., 33, 2005630 (2021); [2] CHE, C. -M.; KWOK, C. -C.; LAI, S. -W. et al; Chem. Eur. J., 16, 233 (2010); [3] SCHMIDT, T. D.; LAMPE, T.; SYLVINSON, D. M. R. et al; Phys. Rev. Appl., 8, 1 (2017).

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