



# Mendeleev 2021

XII International Conference on Chemistry  
for Young Scientists



# BOOK OF ABSTRACTS



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Abstracts presented in the original edition

# PHOSPHORESCENT N<sup>^</sup>C<sup>^</sup>N-CYCLOMETALATED PLATINUM(II) COMPLEXES AND THEIR PHOTOPHYSICAL PROPERTIES

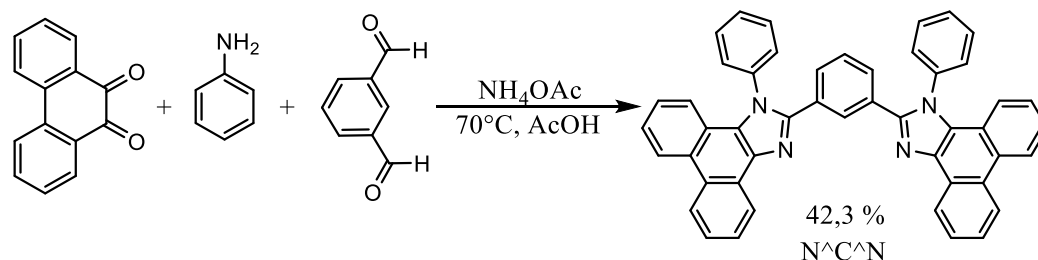
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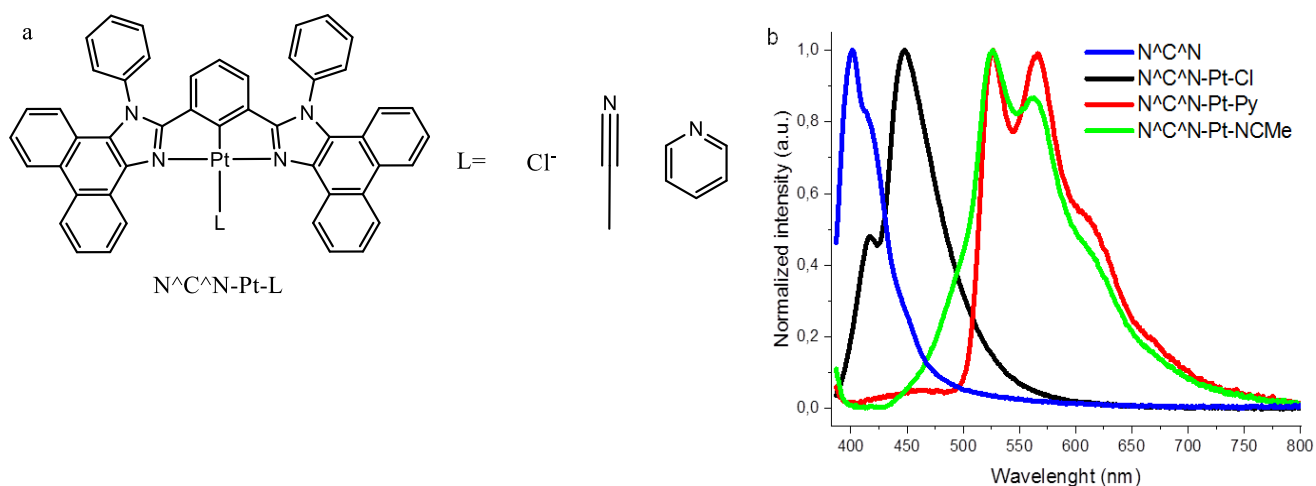
The application of luminescence is widespread. It's used in electronics (for example, OLEDs), biology, optics, and medicine. Among the variety of luminescent compounds, phosphorescent transition metal complexes attract exceptional interest, due to its longer lifetimes and larger Stokes shifts.

Herein we demonstrate synthesis of new pincer N<sup>^</sup>C<sup>^</sup>N-ligand and its platinum(II) complexes. The ligand 1,3-bis(1-phenyl-1*H*-phenanthro[9,10-*d*]imidazol-2-yl) benzene was obtained by heating of phenanthrene-9,10-dione, aniline, and isophthalaldehyde at 70 °C (figure 1). The reaction yield was slightly over 42%.



**Figure 1.** Synthesis of N<sup>^</sup>C<sup>^</sup>N ligand.

Based on this ligand, a series of platinum(II) complexes were obtained. The complex [Pt((1,3-bis(1-phenyl-1*H*-phenanthro[9,10-*d*]imidazol-2-yl)benzene)Cl)] was synthesized from K<sub>2</sub>[PtCl<sub>4</sub>] in an acetic acid solution under reflux. The following functionalization of the complex was carried out with the replacement of the chlorine atom by acetonitrile and pyridine with Ag[PF<sub>6</sub>] without access to light at RT (figure 2a). The obtained complexes were characterized by using NMR-spectroscopy, mass-spectrometry, and XRD analysis. The luminescence properties of all compounds were studied. In dichloromethane solution, the complexes luminesce in the blue-green region of the visible spectrum (figure 2b). The nature of excited state was also studied by means of DFT method.



**Figure 2.** a – Structures of the obtained complexes; b – luminescence spectrum in DCM.

## References

[1] A. I. Solomatina, K. M. Kuznetsov, V. V. Gurzhiy, V. V. Pavlovskiy, V. V. Porsev, R. A. Evarestov, S. P. Tunik, *Dalton Trans.*, **2020**, 49, 6751-6763.

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