Luminescence and Electrochemistry of Platinum(II)-Complexes bearing tridentate C^N^C and C^N^N Ligands

Maren Krause[1], Axel Klein[1*], Klaus Meerholz[2], Cristian A. Strassert[3]

[1] *Universität zu Köln, Institut für Anorganische Chemie, D-50939 Köln*
[2] *Universität zu Köln, Institut für Physikalische Chemie, D-50939 Köln*
[3] *Westfälische Wilhelms-Universität Münster, Physikalisches Institut, D-48149 Münster*

E-mail: maren.krause@uni-koeln.de

Luminescent platinum complexes attracted huge interest over the last years. For example they can be used as dopants for optoelectronic devices like organic light-emitting diodes (OLEDs).[1] Platinum(II) complexes are square planar with d^8 configuration. Thus, the d_{x2-y2} orbital is strongly antibonding. Population of this orbital can cause a significant distortion of the excited state geometry favoring non-radiative decay. Strong field ligands, e.g. carbanionic ligands, can enhance the luminescence properties by destabilizing the strongly antibonding d_{x2-y2} orbital. Thus, non-radiative decay via the d-d excited state is suppressed and emission predominantly occurs through MLCT (metal-to-ligand charge-transfer) or mixed IL(intra ligand)/MLCT states.[2] Tridentate cyclometalating C^N^N or C^N^C ligands additionally benefit of pronounced rigidity.
However, the exact influence of the molecular structure on the luminescence quantum yield and other important photophysical properties are still not fully understood. Therefore, we designed new ligands starting from the elementary structures shown in Fig. 1 and investigated the photophysical and electrochemical behavior of the corresponding platinum complexes.

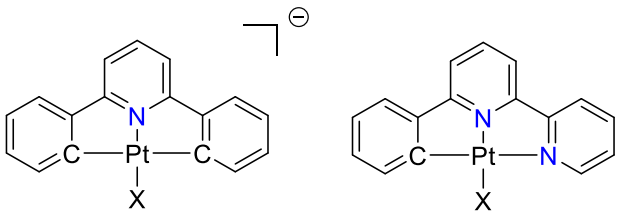

Figure 1: Structures of C^N^C (2,6-diphenyl-pyridine) and C^N^N (6-phenyl-2,2'-bipyridine) platinum(II) complexes with anionic coligands X^- (e.g. halides). Note, that a neutral coligand leads to non-charged C^N^C complexes.

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References:

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