Luminescence reactivity of indium-quinolato complexes at non-ambient temperatures: crystallography, NMR, SEM-EDS, photo-physical and DFT studies.

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The use of Alq\textsubscript{3} as the electroluminescence layer in the edifice of OLED’s stacking, discovered by Tang and Van Slyke, [1] has opened a lot of relative research avenues down the boron group. The attraction to further use of Gallium and Indium trivalent species, mimicking the Alq\textsubscript{3} coordination geometry, also yielded many other interesting results across other scientific fields. KP46, which is known to be a \textit{tris}-quinolato gallium (III) complex, was successfully found to have strong activity against melanoma cells. [2]

Quinoline based ligands have always been very good fluorophores and their complexes with transition metals have been envisaged as promising fluorophores based on their luminescence peculiarities thereof. There has been ongoing research for over three decades looking into the geometrical conformation of these complexes resorting to isomerism (meridional vs. facial). [3] This structural isomerism was often found to have potential impact on the luminescence properties. It was mainly this aforementioned effect that prompted many trials of varying variety of substitutions (EDG and EWG’s) on the ligand backbone to increase the efficiency of this complexes aiming for a specific isomer. [4] What has been very true and crucial is the ability of these quinolinol ligands to give light and form very stable organometallic complexes with aluminium triad metals and that is directly related to their chelato-aromatic properties, stability and tuneable luminescence properties.

The fact that the emissive transitions are ligand based, automates an ideology that, increased number of quinolinol ligands around a metal center would give more light. Considering valence shortcoming of these trivalent icosagens, an opportunity presented itself in peeking at the di-nuclear complexes and therefore an unexpected result from a monomer prompted a further investigation to these Mq\textsubscript{3} complexes. [5] Subsequently, we herein investigate the luminescence durability and structural rigidness of five Indium-quinolato complexes with different quinolinol derivatives at non-ambient temperatures.