

The Efficiency of Red/Near-Infrared Emissions of Iridium Complexes

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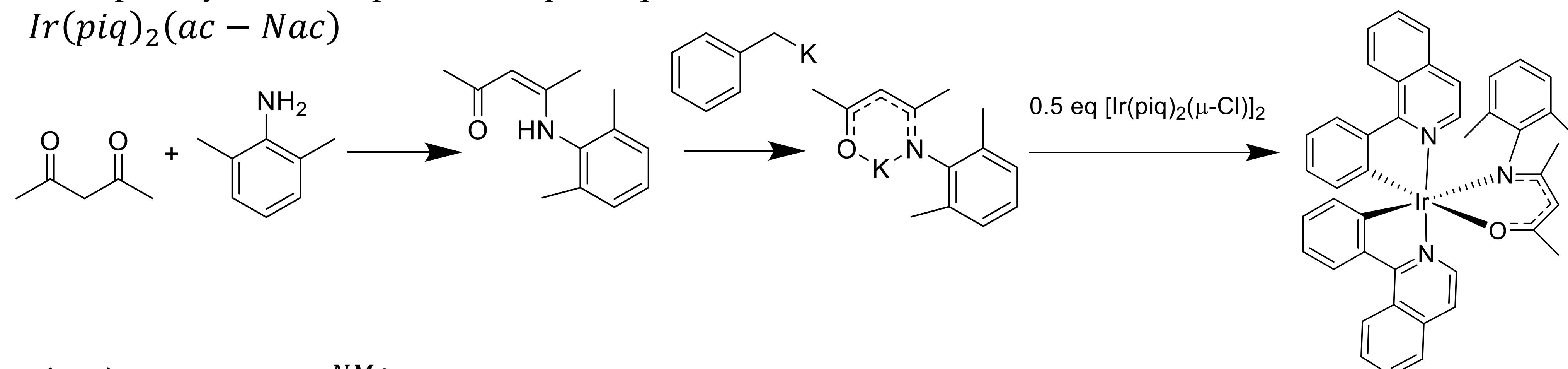
Abstract

A project that concerns the synthesis of three iridium-centered complexes with various ancillary ligands and the analysis of the radiative and nonradiative rates of the complexes has been initiated to further study how ancillary ligand structure affects quantum yield. This data will be used to develop near-infrared emitting devices.

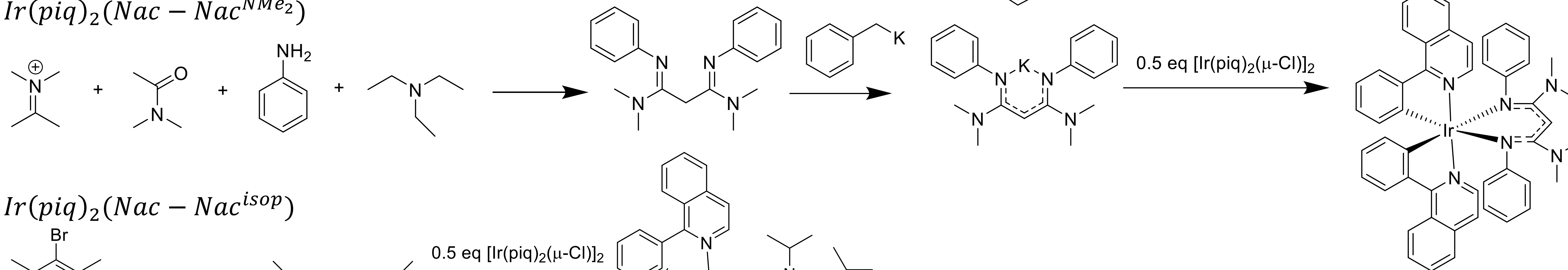
Experimental Section

Each complex synthesis required multiple steps as shown:

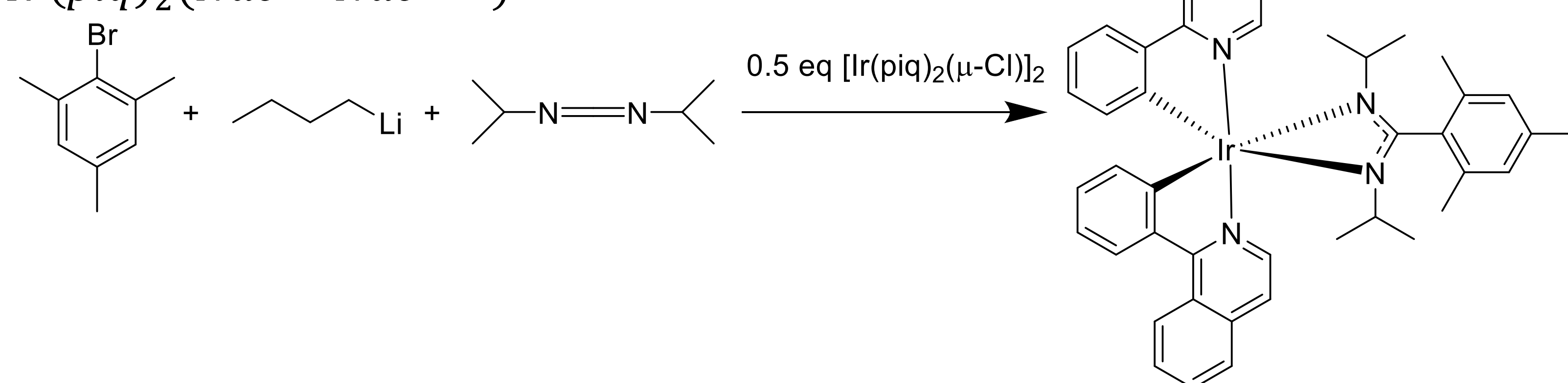
1. $Ir(piq)_2(ac - Nac)$



2. $Ir(piq)_2(Nac - Nac^{NMe_2})$



3. $Ir(piq)_2(Nac - Nac^{isop})$



Results and Analysis

| | Wavelength (nm) | Quantum Yield | Lifetime (μs) | $K_r (* 10^{-5} s^{-1})$ | $K_{nr} (* 10^{-5} s^{-1})$ |
|---|-----------------|---------------|----------------------|--------------------------|-----------------------------|
| 1 | 640 | 0.03 | 0.42 | 0.7 | 23 |
| 2 | 695 | 0.08 | 0.36 | 2.2 | 25 |
| 3 | 658 | 0.18 | 0.86 | 2.1 | 9.5 |

Next Step

I hope to synthesize more iridium-centered compounds with other ancillary ligands and find their quantum yields in order to further contribute to the group's work on red emitting compounds.

References

- Patil, Siddappa A. *Formic Acid: A Low-Cost, Mild, Ecofriendly, and Highly Efficient Catalyst for the Rapid Synthesis of Beta-Enaminones*. Synthetic Communications, Volume 43, Issue 17, Pages 2349-2364, Journal; Online Computer File, 2013
- Tripathi, Monika. *Investigation of the Full Reversal of Selectivity in the Reaction of Aniline With 1,3-dichloro-1,3-bis(dimethylamino)vinamidinium Salts*. New Journal of Chemistry, Volume 41, Issue 24, Pages 15016-15020, Journal; Online Computer File 2017.

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