

# Fluorinated Tris(pyridyl)borate

## Supporting Isocyanide and Phosphine Complexes of Coinage Metals

Mukundam Vanga, Vo Quang Huy Phan, Tiffany N. Do, H.V. Rasika Dias\*

**Introduction:**

Poly(pyrazolyl)borates

- Polar B-N linkages
- 3 substitutable positions

**Poly(pyridyl)borates:**

- Stable B-C linkages
- 4 substitutable positions
- The 6-substituent is closer to the coordination sphere
- Better  $\sigma$  - donor ligands

**Applications:**

- Coordination chemistry
- Biomimetic chemistry
- Catalysis
- Development of new materials

**Importance of Fluorinated ligands**

- High thermal stability
- High oxidative stability
- Unique reactivity

**Our work**

Vanga, M.; Noonikara-Poyil, A.; Muñoz-Castro, A.; Dias, H. V. R. *Dalton Trans.* 2022, 51 (4), 1308.

**Synthesis of Fluorinated Tris(pyridyl)borate Potassium Complex:**

isolated

MeTpyK

Watson, B. T.; Vanga, M.; Noonikara-Poyil, A.; Muñoz-Castro, A.; Dias, H. V. R. *Inorg. Chem.* 2023, 62 (4), 1636-1648.

**Synthesis of Isocyanide Coinage Metal Complexes:**

MeTpyK

MeTpyM(CN<sup>t</sup>Bu)

MeTpyM(CN <sup>t</sup> Bu)	IR (cm <sup>-1</sup> ) C≡N stretching
Cu	2177
Ag	2179
Au	2240
Free <i>t</i> -BuCN	2138

Free *t*-BuCN

Cu Ag Au

$\nu_{\text{C}\equiv\text{N}}(\text{cm}^{-1})$

**Synthesis of Phosphine Coinage Metal Complexes:**

MeTpyK

MeTpyM(PPh<sub>3</sub>)

MeTpyM(PPh <sub>3</sub> )	<sup>19</sup> F	<sup>31</sup> P{ <sup>1</sup> H}
Cu	d ( $J_{\text{F-P}} = 6.5$ Hz)	brs
Ag	dd ( $J_{\text{F-P}} = 7.8$ Hz, $J_{\text{F-Ag}} = 3.6$ Hz)	$^1J_{\text{P-109Ag}} = 718.0$ Hz, $^1J_{\text{P-107Ag}} = 622.2$ Hz, $^1J_{\text{P-F}} = 7.8$ Hz
Au	d ( $J_{\text{F-P}} = 1.6$ Hz)	brs

**Acknowledgements:**

Dr. Rasika Dias  
Dr. Mukundam Vanga  
Vo Quang Huy Phan  
Brandon Watson  
Deepika Karade  
Achala Wagure