

# Sintesis Ligan para-di-2-(1-methyl-3-pyridyl-4,5-dihydro-1H-pyrazol-5-yl)benzena dan Aplikasinya sebagai Fluorosensor Ion Logam Cd<sup>2+</sup> dan Pb<sup>2+</sup> = Synthesis of para-di-2-(1-methyl-3-pyridyl-4,5-dihydro-1H-pyrazol-5-yl)benzene Ligand and Its Application as Fluorosensor for Cd<sup>2+</sup> and Pb<sup>2+</sup> Metal Ions

Yulian Syahputri, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20389612&lokasi=lokal>

---

## Abstrak

Ligan para-di-2-(1-methyl-3-pyridyl-4,5-dihydro-1H-pyrazol-5-yl)benzena telah berhasil disintesis menggunakan metode kondensasi Claisen-Schmidt. Hasil yang diperoleh berupa padatan kuning sebesar 44,1% dan dikarakterisasi menggunakan spektrofotometer UV-Vis, spektrofotometer inframerah dan spektrometer NMR. Aplikasi ligan ini sebagai fluorosensor untuk ion logam Cd<sup>2+</sup> dan Pb<sup>2+</sup> dilakukan dengan menggunakan spektrofluorometer. Hasil studi fluoresensi menunjukkan bahwa ligan mempunyai intensitas fluoresensi yang kuat. Hal ini didukung oleh nilai absorptivitas molar (ε) yang besar.

Studi spektroskopi UV-Vis pada penambahan ion Cd<sup>2+</sup> dan Pb<sup>2+</sup> menunjukkan munculnya puncak baru pada daerah panjang gelombang 290 nm. Hal ini menunjukkan bahwa terbentuk kompleks antara ion logam (Cd<sup>2+</sup> dan Pb<sup>2+</sup>) dengan ligan para-di-2-(1-methyl-3-pyridyl-4,5-dihydro-1H-pyrazol-5-yl)benzena. Studi aplikasi fluorosensor menunjukkan bahwa ligan ini dapat dijadikan fluorosensor tipe off-on untuk ion Cd<sup>2+</sup> karena penambahan ion ini menyebabkan peningkatan intensitas fluoresensi dan fluorosensor tipe on-off untuk ion Pb<sup>2+</sup> karena penambahan ion ini menyebabkan penurunan intensitas fluoresensi.

Hasil studi selektivitas fluorosensor menunjukkan bahwa ligan para-di-2-(1-methyl-3-pyridyl-4,5-dihydro-1H-pyrazol-5-yl)benzena merupakan fluorosensor yang selektif terhadap penambahan ion Cd<sup>2+</sup> pada panjang gelombang maksimum (maks) 450 nm, dan selektif terhadap penambahan ion Pb<sup>2+</sup> pada panjang gelombang maksimum (maks) 430 nm.

.....Ligand para-di-2-(1-methyl-3-pyridyl-4,5-dihydro-1H-pyrazol-5-yl)benzene has been synthesized using Claisen-Schmidt condensation method. The solid yellow precipitate was 44,1% and characterized by UV-Visible spectrophotometer, Infrared spectrophotometer and NMR spectrometer. The application of this ligand as fluorosensor for Cd<sup>2+</sup> and Pb<sup>2+</sup> metal ions was studied by using spectrofluorometer. Fluorescence studies indicate that the ligand has a strong fluorescence intensity.

This is supported by a large molar absorptivity (ε) value. UV-Vis spectroscopy studies on the addition of Cd<sup>2+</sup> and Pb<sup>2+</sup> ions showed the emergence of a new peak at 290 nm wavelength region. This indicates that the complexes formed between metal ions (Cd<sup>2+</sup> and Pb<sup>2+</sup>) with para-di-2-(1-methyl-3-pyridyl-4,5-dihydro-1H-pyrazol-5-yl)benzene ligand. Application fluorosensor studies showed that these ligands can be used as off-on type fluorosensor for Cd<sup>2+</sup> ions due to the addition of these ions causes an enhanced in fluorescence intensity and fluorosensor on-off type for Pb<sup>2+</sup> ions due to the addition of these ions causes a quenched in fluorescence intensity.

The results of the study of fluorosensor selectivity showed that the ligand para-di-2-(1-methyl-3-pyridyl-4,5-dihydro-1H-pyrazol-5-yl)benzene is fluorosensor selective addition of Cd<sup>2+</sup> ions at the maximum wavelength (max) 450 nm, and the selective addition of Pb<sup>2+</sup> ions at the maximum wavelength (max) 430 nm.