

## キノリン類縁体を有するエチレンジアミン型五座配位子を用いた銅単核錯体の構造と電気化学的特性

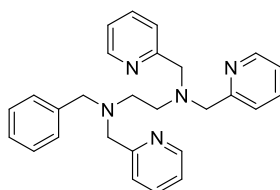
(奈良女大理<sup>1</sup>・奈良女大工<sup>2</sup>・奈良女大共生セ<sup>3</sup>)・○明渡 美結<sup>1</sup>・濱本 絵里奈<sup>1</sup>・吉田 祥子<sup>1</sup>・三方 裕司<sup>1,2,3</sup>

Structure and Electrochemical Properties of Mononuclear Copper Complexes with Ethylenediamine-Based Pentadentate Ligands bearing Quinoline Analogs (<sup>1</sup>*Faculty of Science*, <sup>2</sup>*Faculty of Engineering*, <sup>3</sup>*KYOUSEI Science Center, Nara Women's University*) ○Miyu Akedo,<sup>1</sup> Erina Hamamoto,<sup>1</sup> Shoko Yoshida,<sup>1</sup> Yuji Mikata<sup>1,2,3</sup>

Enzymatic reactions proceed efficiently and selectively under mild conditions, but enzymes, which are proteins, are unstable and difficult to handle. Therefore, synthesis of model compounds that can mimic the active center of enzymes and reproduce their functions has been actively studied. In this study, copper complexes were synthesized using pentadentate ligands based on ethylenediamine, and the effects of the ligand structure on the structure and electrochemical properties of the copper complexes were investigated. **Bn-TPEN (Figure 1)** and its derivatives in which the benzyl groups were replaced with phenyl and methyl groups, and the 2-pyridyl groups were replaced with 2-quinolyl, 1-isoquinolyl, and 3-isoquinolyl groups were prepared as the ligands. Then, the resulting copper complexes were analyzed by X-ray crystallography and redox potential measurements. The complexes with a phenyl group conjugated with the aliphatic nitrogen atom and with less electron-donating 2-quinolyl groups exhibited positive shifts in the redox potential of  $\text{Cu}^{\text{II}} \leftrightarrow \text{Cu}^{\text{I}}$ .

**Keywords :** Pentadentate Ligands; Ethylenediamine; Quinoline Analogs; Copper; Electrochemical Properties

酵素反応は、穏やかな条件で高効率かつ高選択的に進行するが、タンパク質である酵素は不安定で扱いにくい。そこで、酵素の活性中心を模倣し、酵素の機能を再現できるモデル化合物の合成が盛んに行われている。本研究では、エチレンジアミンを基本骨格とする五座配位子を用いて銅錯体を合成し、配位子の構造が銅錯体の構造と電気化学的性質に与える影響について調べた。配位子には、**Bn-TPEN (Figure 1)** とそのベンジル基をフェニル基およびメチル基に置き換えたもの、また 2-ピリジル基を 2-キノリル基、1-イソキノリル基、3-イソキノリル基に置き換えたものを用い、得られた銅錯体の X 線結晶構造解析および酸化還元電位の測定を行った。脂肪族窒素原子と共役したフェニル基を持つ配位子や、塩基性の低い 2-キノリル基を持つ配位子を含む銅錯体では、金属中心への電子供与性が小さくなり、 $\text{Cu}^{\text{I}} \leftrightarrow \text{Cu}^{\text{II}}$ の酸化還元電位が正側にシフトすることが分かった。



**Bn-TPEN**

**Figure 1.** Structure of **Bn-TPEN**.