

Control of Optical Properties by Metal Complexation Based on Carborane Derivatives

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Carborane (CB) is a spherical cluster compound consisting of hydrogen, carbon, and boron. It has been revealed that aryl-substituted CB derivatives show intramolecular charge transfer emission and excimer emission in solid state by utilizing intramolecular and intermolecular interaction of CB and π -conjugated systems.¹⁻³ In this work, we have investigated the effects of metal complexation on optical properties and molecular interactions of aryl-substituted CB derivatives. We especially focus on platinum (II) complexes for exhibiting unique stacking and molecular arrangement behavior in solid state.^{4, 5}

We synthesized CB ligands with 2,2'-bipyridyl-substituted at different positions which can coordinate with metal ions (Figure 1). Two CB ligands exhibit similar behavior in absorption and emission to 2,2'-bipyridine. Metal complexation was performed with two ligands (Figure 2). **B4** reacted with $\text{PtCl}_2(\text{DMSO})_2$ in acetonitrile solution to afford Pt^{II} complex. **B4** and **B6** reacted with $\text{PtCl}_2(\text{DMSO})_2$ in dimethyl sulfoxide solution to afford anionic Pt^{II} complexes with elimination of one boron atom. In this presentation, we will discuss optical properties and the effects of substitute position of CB and metal coordination.

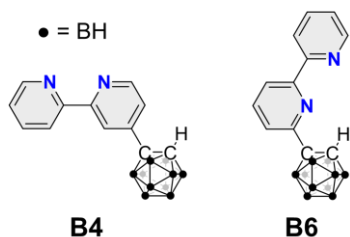


Figure 1. Chemical structures of CB derivatives, **B4** and **B6**.

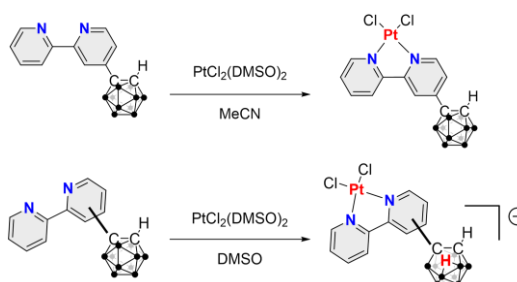


Figure 2. Synthetic scheme of Pt^{II} complexes of CB ligands.

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