

마크로싸이클 리간드에 의해 안정화된 유기금속 화합물의
합성 및 특성 연구. I. 완전히 공액된 마크로싸이클
리간드의 철 착화합물의 산화환원*

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**Synthesis and Characterization of Organometallic Compounds
Stabilized by Macrocyclic Ligands. I. Oxidation-Reduction
of Iron Complexes of a Fully Conjugated Macrocyclic Ligand***

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The organometallic compounds, especially alkyl or hydride transition metal complexes, are attractive as catalysts because of their ability to transfer alkyl or hydride groups to the substrates.^{1,2} However, simple hydride or alkyl complexes of transition metals are unstable because of the accumulation of electron density on the metals, and most of the known alkyl or hydride complexes contain electron accepting ligands such as carbon monoxide or phosphine. Although vitamin B₁₂ coenzyme has been known for quite a long time as a porphyrin derivative containing a cobalt-alkyl σ bond,^{3,4} there has been little research on the analogous synthetic ligand complexes, especially the iron macrocyclic complexes.⁵⁻⁸

In an attempt to prepare the organometallic compounds containing macrocyclic ligands, we have searched for the suitable macrocyclic ligands

that lower the electron density of the metal ion, and, consequently, stabilize the metal-alkyl or metal-hydride σ bonds. The earlier studies on the stretching frequencies of carbon monoxide in the iron (II) carbon monoxide complexes containing various macrocyclic ligands revealed that the Fe-CO bond is weakened as the degree of the double bond conjugation in the macrocyclic ligand increases.⁹ This implicates that the electron density of the iron atom is reduced as the degree of conjugation in the macrocyclic ligand increases.

In order to obtain further information on the electronic effects exerted by the extensively conjugated macrocyclic ligands and on the stabilization of the alkyl derivatives of the iron complexes by such ligands, we have investigated the electrochemical behavior of the iron complexes of [2, 5, 11, 14-tetramethyl-3, 4, 12, 13, 15, 17-decaene-N³, N¹², N¹⁹, N²⁰] (L).¹⁰

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