学位論文要約

Development of Functional Materials Derived from Organoarsenic Homocycles

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2016
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1,4-Dihydro-1,4-diarsinine derivatives (DHDAs) have been safely synthesized from organoarsenic homocycles which were synthesized by reduction of nonvolatile precursors. This thesis describes synthesis and properties of functional organoarsenic materials based on DHDAs and novel synthetic method of organoarsenic compound by organoarsenic homocycles.

In chapter 1, mononuclear diiodoplatinum(II) complex with *cis*-1,4-dihydro-1,4-dimethyl-2,3,5,6-tetrakis(*tert*-butoxycarbonyl)-1,4-diarsinine (DHDAtBu) showed on-off solid-state luminescence switching through reversible solvent vapor uptake and escape.

In chapter 2, mononuclear diiodoplatinum(II) complex with *cis*-1,4-dihydro-1,4-dimethyl-2,3,5,6-tetrakis(methoxycarbonyl)-1,4-diarsinine (DHDAMe) formed three different crystalline polymorphs that can be either concomitantly or separately obtained on varying the recrystallization conditions.

In chapter 3, 1,4-dihydro-1,4-diarsininetetracarboxylic acid dianhyride with excess amounts of amine provided 3-aminomaleimides which showed aggregation-induced emission (AIE) properties.

In chapter 4, novel facile and practical As-C bond formation method was developed and applied to synthesize arsafluorenes. Although arsenic halides were useful for As-C bond formations, their toxicity and volatility has prevented practical synthesis of organoarsenic compounds. In the present method, diiodoarsine derivatives were quantitatively in-situ generated by mixing organoarsenic homocycles and iodine. The diiodoarsine derivatives can be used for facile and practical As-C bond formation. π-Conjugated material constructed with alsole backbone, arsafluorenes, were synthesized and their optical properties were

studied.

In chapter 5, novel organoarsenic π-conjugated compound, dithienoarsoles, were synthesized by the in-situ arsenic iodination method. Derivatization and their properties were studied.