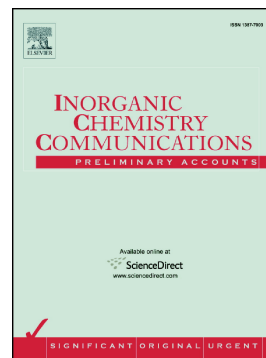


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STABILIZATION OF LOW VALENT 14 GROUP METAL COMPLEXES BY 9,10-DIAMIDOPHENANTHRENE LIGAND

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Abstract

Stable germylenes and stannylens bearing 9,10-diamidophenanthrene ligands were synthesized. Complexes were prepared by two methods: a) the reaction of dianionic lithium salts of phenanthrene-9,10-diimine with low valent 14 group metal halides ($\text{GeCl}_2 \cdot \text{dioxane}$, $\text{SnCl}_2 \cdot \text{dioxane}$); b) the treatment of phenanthrene-9,10-diamine with $\text{M}[\text{N}(\text{SiMe}_3)_2]_2$ ($\text{M} = \text{Ge}, \text{Sn}$). The analogous $\text{Pb}(\text{II})$ complex was found to be unstable. The structures of the metallenes were determined by single crystal X-ray diffraction analysis. The germylene **1** as well as the stannylene **2** react with different radicals giving unstable paramagnetic derivatives that were identified by EPR spectroscopy.

Keywords: germylene, stannylene, 9,10-diamidophenanthrene ligand, EPR, X-ray diffraction.

It is known that N-heterocyclic carbenes being sigma-donor nucleophilic reagents are able to form complexes with many elements and stabilize metals in a low valence state [1]. Metal complexes of N-heterocyclic carbenes known as a second-generation Grubbs catalysts are widely used in homogeneous catalysis [2]. In such metal derivatives carbenes behave as spectator ligands affecting the processes through a combination of steric and electronic effects without interacting with the substrate. Considerable interest in the chemistry of heavier carbene analogues [3] has been developed following the isolation of the first stable N-heterocyclic carbene in 1991 by Arduengo[4]. At present a plethora of stable silylenes[5], germylenes[6],

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