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Short Communication

New Catalyst For N-Heptane Isomerization And Dehydrocyclization Processes

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Abstract

New coordination compounds of copper (II) with a nitrogen-containing organic cat-ion 2,3,5-triphenyltetrazolium (2,3,5-ph_3Tz) of the composition (2,3,5-$ph_3Tz)_2[CuCl_4]$ [1], (2,3,5-$ph_3Tz)_2[CoCl_4]$ [2], (2,3,5-$ph_3Tz)_2[CuBr_4]$ [3], (2,3,5-$ph_3Tz)_2[CuBr_3]$ [4], and their cata-lytic activity in the isomerization prosess of light gasoline fractions, have been investigated.

Keywords: GC-MS Analysis; Antibacterial and Antioxidant Activities

Introduction

Despite the huge number of known catalysts in the oil refining industry, modern pro-duction needs new highly efficient and more environmentally acceptable catalysts, catalytic media, and solvents. Over the past few years, complexes of transition 3d-metals with nitrogen-containing cations of the composition $(HL)_n[MHal_4]$ have attracted great interest in oil chemistry as new catalytic systems [1]. Tetrahalide complexes of copper (II) and cobalt (II) with 2,3,5-triphenyltetrazolium chloride of the composition (2,3,5-$ph_3Tz)_2[MCl_4]$ [2] show high catalytic activity in the joint low-temperature process of isomerization and dehydrocyclization of n-heptane. In the present work, the complexes are formed because of the interaction of hydro-chloric acid solutions of halometalates (II) with aqueous solutions of LCl (Figure 1) according to the scheme: 2 (2,3,5-ph_3Tz^+) + $[MX_4]2-$ → (2,3,5-$ph_3Tz)2[MX_4]$ ↓.

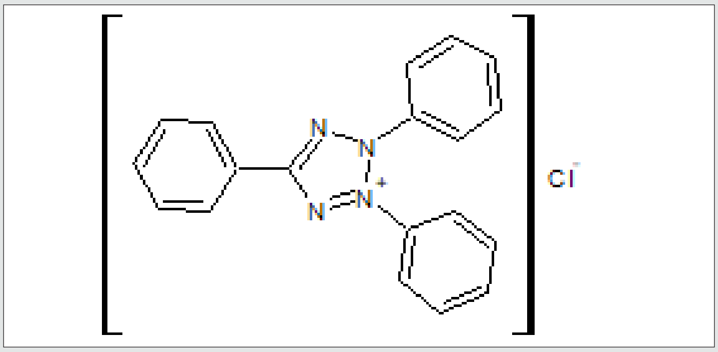

Figure 1: Unit of 2,3,5-triphenyltetrazolium chloride, (2,3,5-ph_3Tz) Cl.

According to the X-Ray data, the presented coordination compounds have a crystal structure, in which each $[CuX_4]^{2-}$ anion is surrounded with four organic cations. Two halogen atoms form bridging hydrogen bonds with neighboring triphenyltetrazolium cations (Figure 2). As a result of the joint low-temperature process of isomerization and dehydrocyclization of n heptane, it was found that the main reaction products are 2(3)-methylhexane, 2,3 dimethylcyclopentane, methylcyclohexane. The diagram shows the total yield of n heptane conversion products in the presence of various complexes, depending on the temperature at a reaction time of 2 hours. The maximum yield of products for the tetrachlorocuprate (II) complex is observed at 80°C, for tetrachlorocobaltate (II) is at 60° C (Figure 3). The catalytic activity of copper coordination compounds in the processes of isomerization and dehydrocyclization of n-heptane is due to the formation of an intermediate complex (2,3,5 $ph_3Tz)2[Cu^IBr_3]$ (Figure 4).

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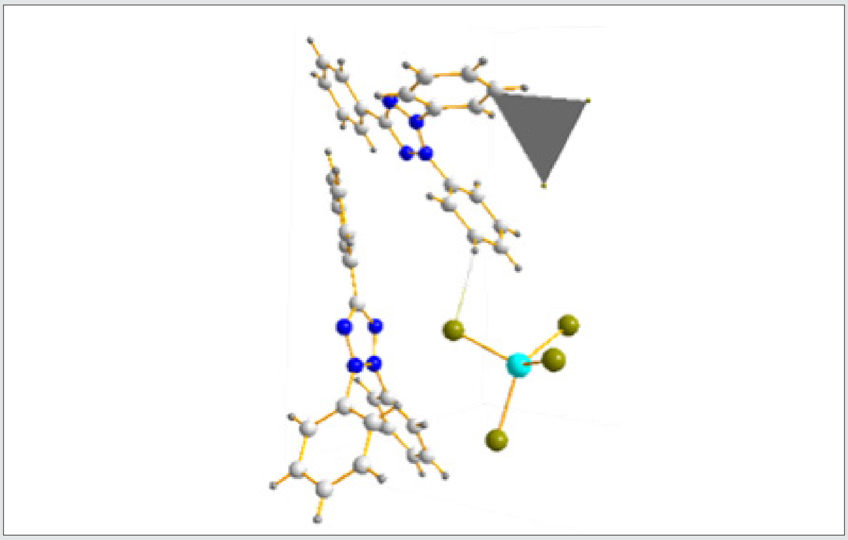

Figure 2: Crystal structure $(2,3,5\text{-}ph_3Tz)_2[CuBr_4]$

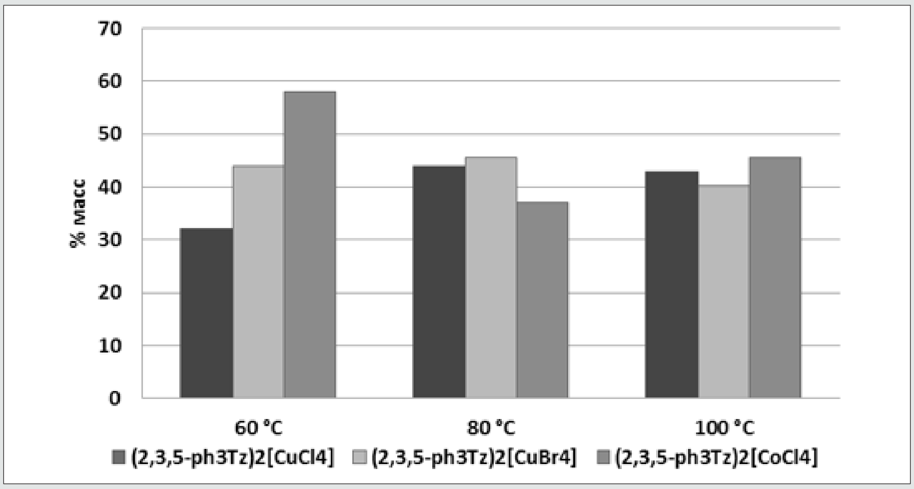

Figure 3: Data on the catalytic activity of compounds.

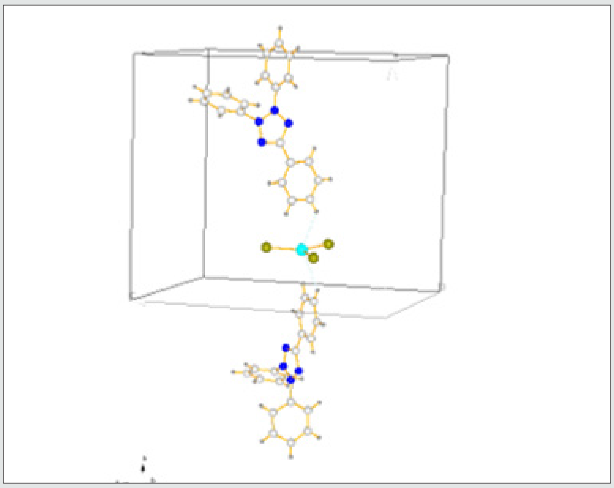

Figure 4: Crystal structure $(2,3,5\text{-}ph_3Tz)_2[CuIBr_3]$.

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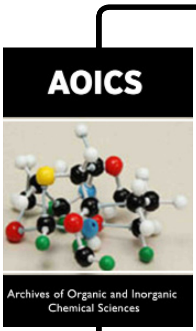

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