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Synthesis, structure, and catalytic performance of solvent induced zinc clusters in furan synthesis by cycloisomerization reaction

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Streszczenie

Two Zn(II) clusters were synthesized by the reaction of $Zn(OAc)_2{\cdot}2H_2O$ and 1,2-bis(2-hydroxy-3-methoxybenzylidene)hydrazine as a N_2O_4-donor Schiff base ligand in 1:3 molar ratio. The reaction in methanol gave yellow-brown needle crystals, while block yellow crystals were achieved in a mixture of methanol:water (50:50 v/v). Investigation of the crystals by single crystal X-ray analysis showed that solvent has considerable effect on the structure and composition of the products. In methanol, two independent pentanuclear Zn(II) clusters with the same general formula of $[Zn_5(L)_2(\mu\text{-}OAc)_4(OAc)_2(CH_3OH)_2]$ but different coordination environments around Zn(II) cores, and bridging mode of the acetate ligands are present in the unit cell. In a mixture of methanol:water, a pentanuclear cluster and a 1D coordination polymer with pentanuclear repetitive unit are simultaneously present in the crystal structure. These compounds were further characterized by spectroscopic techniques, and they were used as catalysts for intramolecular cycloisomerization of 1,4-diphenylbut-3-yn-1-one. The results indicated that these Zn(II) clusters can efficiently produce 2,5-diphenylfuran through catalytic cycloisomerization reaction.

Słowa kluczowe

catalytic activity, cycloisomerization, furan synthesis, structure, Zn(II) clusters

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