

Neue Bisguanidin-Kupfer-Komplexe und ihre Anwendung in der ATRP

New Bisguanidine-Copper Complexes and their Application in ATRP

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The ligands TMG₂e [bis(*N,N,N',N'*-tetramethylguanidino)ethane] and DMEG₂e [*N*¹,*N*²-bis(1,3-dimethylimidazolin-2-ylidene)ethane-1,2-diamine] were used in the complexation of copper cations to give the new complexes [Cu(TMGe)₂][Cu₂I₄], [Cu(TMGe)Cl₂] and [Cu(DMEG₂e)₂]-[CuCl₂]. Single-crystal structure determination shows that the complexes [Cu(TMGe)Cl₂] and [Cu(DMEG₂e)₂][CuCl₂] both crystallise in the monoclinic space group *C2/c*, the complex [Cu(TMGe)₂][Cu₂I₄] in the orthorhombic space group *Pbca*. The copper atoms in all complex cations reside in a coordination environment between tetrahedral and square-planar geometry. The application of copper complexes with TMG₂e and DMEG₂e as ligands in atom transfer radical polymerisation (ATRP) was investigated with styrene as monomer. The polymerisation process with both ligand systems shows even at low temperature unexpected high conversions and molecular weight distributions that are evidence of a well controlled ATRP. These first results in the application of guanidine ligands in ATRP show that these ligands have high potential, but that further process optimisations and ligand tuning are necessary to develop highly active catalysts for ATRP.

Key words: Bisguanidine Ligands, Copper Complexes, X-Ray, Low Polymerisation Temperatures, ATRP