

Quaternary 4-Amino-1,2,4-triazolium Salts: Crystal Structures of Ionic Liquids and *N*-Heterocyclic Carbene (NHC) Complexes

Alexander Schwärzler^{a,b}, Gerhard Laus^a, Volker Kahlenberg^c, Klaus Wurst^a, Thomas Gelbrich^d, Christoph Kreutz^e, Holger Kopacka^a, Günther Bonn^b, and Herwig Schottenberger^a

^a Institute of General, Inorganic and Theoretical Chemistry, University of Innsbruck, 6020 Innsbruck, Austria

^b Institute of Analytical Chemistry and Radiochemistry, University of Innsbruck, 6020 Innsbruck, Austria

^c Institute of Mineralogy and Petrography, University of Innsbruck, 6020 Innsbruck, Austria

^d Institute of Pharmacy, University of Innsbruck, 6020 Innsbruck, Austria

^e Institute of Organic Chemistry, University of Innsbruck, 6020 Innsbruck, Austria

Reprint requests to Prof. Dr. Herwig Schottenberger. Fax: (+43) 512 507 2934.

E-mail: herwig.schottenberger@uibk.ac.at

Z. Naturforsch. **2009**, *64b*, 603–616; received April 15, 2009

Dedicated to Professor Gerhard Maas on the occasion of his 60th birthday

Quaternary salts were prepared by reaction of 4-amino-1,2,4-triazole and 4-amino-3,5-dialkyl-1,2,4-triazoles (alkyl = Me, Et) with dimethyl and diethyl sulfate at ambient temperature. Subsequent ion metathesis gave hexafluorophosphates and bis(trifluoromethylsulfonyl)imides as crystalline derivatives or ionic liquids. Methylation at 100 °C gave the 4-(dimethylamino)-1-methyl-1,2,4-triazolium salt, a precursor for a new carbene ligand which was incorporated into Ag and Rh complexes. The synthesis of 5-bromo-4-(dimethylamino)-1-methyl-1,2,4-triazolium hexafluorophosphate is also reported. Crystal structures of fourteen compounds have been determined by X-ray diffraction.

Key words: Carbene, Ionic Liquid, NHC, Rhodium, Silver, Triazolium