Synthesis and Characterization of a Three-dimensional Coordination Polymer Based on Copper(II) Nitrate and a Tridentate Tetrazole Ligand

Vera Hartdegen, Thomas M. Klapötke, and Stefan M. Sproll

Department of Chemistry and Biochemistry, University of Munich (LMU), Butenandtstr. 5–13, 81377 München, Germany

Reprint requests to Prof. T. M. Klapötke. E-mail: tmk@cup.uni-muenchen.de

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Dedicated to Professor Hubert Schmidbaur on the occasion of his 75th birthday

Tris(2-(1H-tetrazol-1-yl)ethyl)amine (1) was synthesized as gas-generating agent and characterized by vibrational (IR) and NMR spectroscopy. The energetic properties were determined by bomb calorimetric measurements along with calculations using the EXPLO 5 software. Tris(2-(1H-tetrazol-1-yl)ethyl)amine (1) was used for further reactions with copper(II) nitrate to form a three-dimensional coordination polymer 3. Both compounds were characterized by single crystal X-ray diffraction. The thermal stability was determined by DSC measurements and the physical stability by BAM standards. Tris(2-(1H-tetrazol-1-yl)ethyl)amine (1) proved to be suitable as gas-generating agent with sufficient physical and thermal stabilities. The low thermal stability of the copper complex 3 disqualifies it as potential colorant agent for pyrotechnical applications.

Key words: Coordination Polymer, Tetrazole, Energetic, Gas Generating