Orthoamide and Iminium Salts, LXXI [1]. Capturing of Carbon Dioxide with Organic Bases (Part 2) – Reactions of Guanidines and $\omega$-Aminoalkyl-guanidines with Carbon Dioxide

Ioannis Tiritiris$^{a,b}$, Jochen Mezger$^a$, Edmont V. Stoyanov$^a$ and Willi Kantlehner$^{a,b}$

$^a$ Fakultät Chemie/Organische Chemie, Hochschule Aalen, Beethovenstraße 1, 73430 Aalen, Germany
$^b$ Institut für Organische Chemie, Universität Stuttgart, Pfaffenwaldring 55, 70569 Stuttgart, Germany

Reprint requests to Prof. Dr. Willi Kantlehner. Fax: +49(0)7361/5762250.
E-mail: willi.kantlehner@htw-aalen.de


The guanidines 1, 4, 6, 8, 10, and 12 react with carbon dioxide in the presence of traces of water to give the guanidinium hydrogen carbonates 3, 5, 7, 9, 11, and 13. The crystal structures of the salts reveal the presence of centrosymmetric hydrogen carbonate ion dimers, which are connected by O–H···O hydrogen bonds. Additionally the cations are associated with the anions via N–H···O hydrogen bonds. The reaction of the $N$-(aminoalkyl)guanidine 14 with CO$_2$ in the presence of traces of water affords a stable hygroscopic carbamic acid as the hydrogen carbonate salt 15. In the crystal structure of 15 the hydrogen carbonate ion is connected with the carbamic acid moiety by strong O–H···O hydrogen bonds.

Key words: Carbon Dioxide, Guanidines, $\omega$-Aminoalkylguanidines, Guanidinium Hydrogen Carbonates, Carbamic Acid, X-Ray Structures