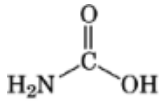
Kirk-Othmer Encyclopedia of Chemical Technology.

CARBAMIC ACID

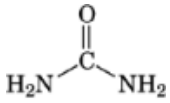
Carbamic acid [463-77-4], NH_2COOH, is the hydrated form of isocyanic acid [75-13-8], H—N=C=O. It is not known in the free state; hydrolysis rapidly gives ammonia and carbon dioxide.

$$H—N=C=O + H_2O \longrightarrow [H_2NCOOH] \longrightarrow CO_2 + NH_3$$

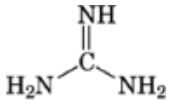
Carbamic acid is the monoamide of carbonic acid; the diamide is the well-known compound urea [57-13-6], also called carbamide (see Urea). Guanidine [113-00-8] could be regarded as the amidine of carbamic acid (see Cyanamides).



carbamic acid



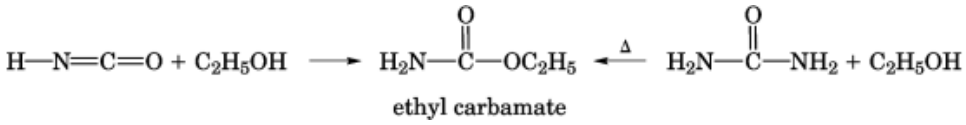
urea



guanidine

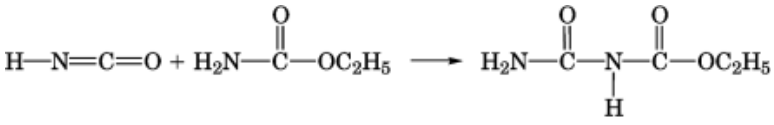
The acid chloride (chloroformamide [463-72-9], "urea chloride"), NH_2COCl, and its salts have been prepared. Ammonium carbamate [1111-78-0], can be obtained as a white crystalline solid by reaction of dry carbon dioxide and ammonia. It is an impurity in commercial ammonium carbonate [506-87-6] (see Ammonium compounds). Esters of carbamic acid are quite stable. The best known is the ethyl ester usually called urethane [51-79-6].

Alkyl carbamates (urethanes) are formed from reaction of alcohols with isocyanic acid or urea (see Urethane polymers).



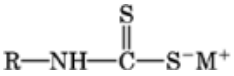
ethyl carbamate

With excess isocyanic acid, stable allophanates are formed (see Cyanuric and isocyanuric acids).



ethyl allophanate

Salts of *N*-substituted dithiocarbamic acid [594-07-0] are used as fungicides (qv) and rubber vulcanization accelerators (see Rubber chemicals).



Related Articles

Urea; Cyanamides; Cyanuric and isocyanuric acids; Urethane polymers; Rubber chemicals