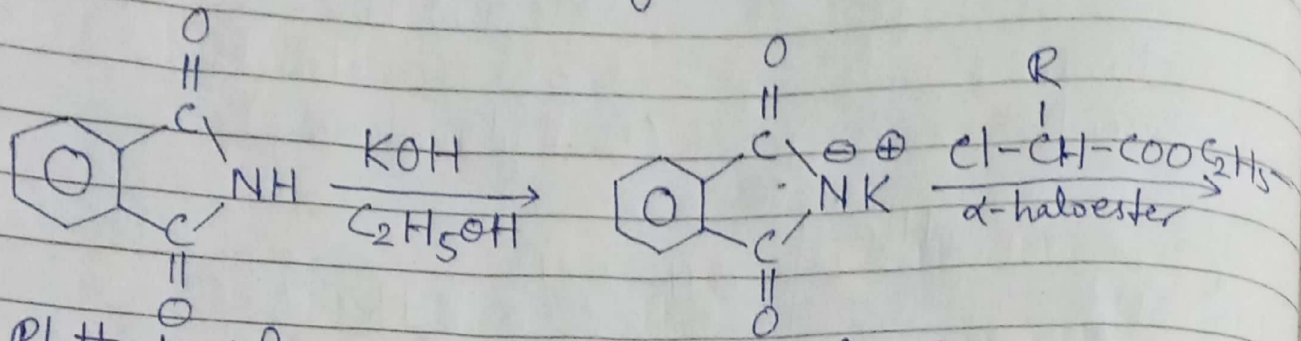
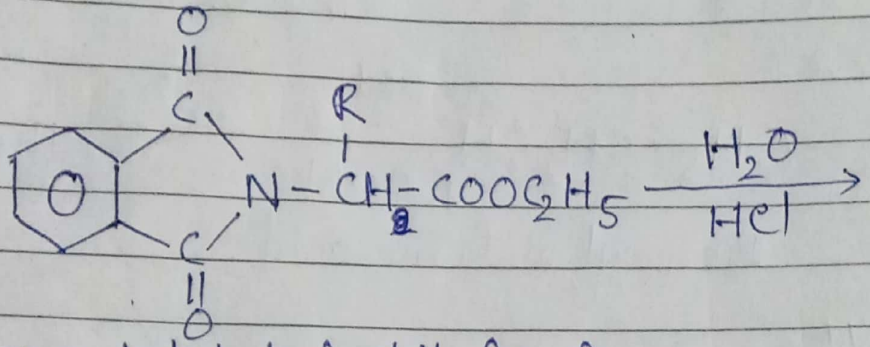
(3) Gabriel phthalimide synthesis - It involves the reaction between an α-halo ester and potassium phthalimide followed by alkaline hydrolysis results in the formation of α-amino acids.

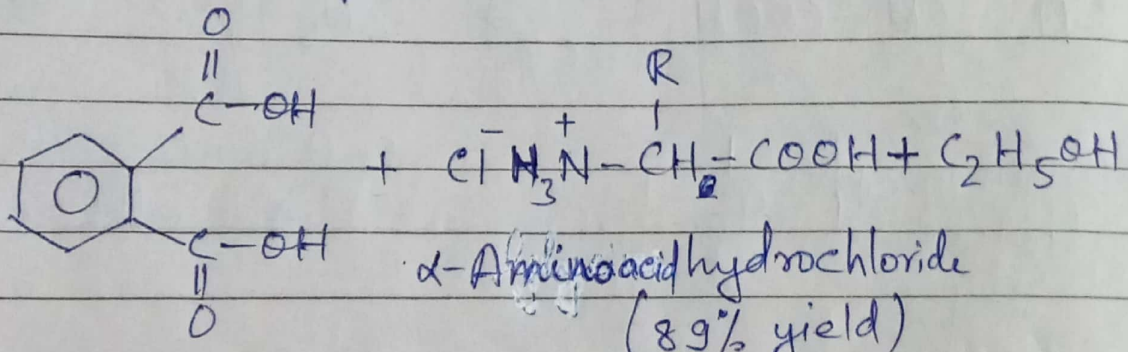


Phthalimide

Pot. phthalimide



N-substituted phthalimide

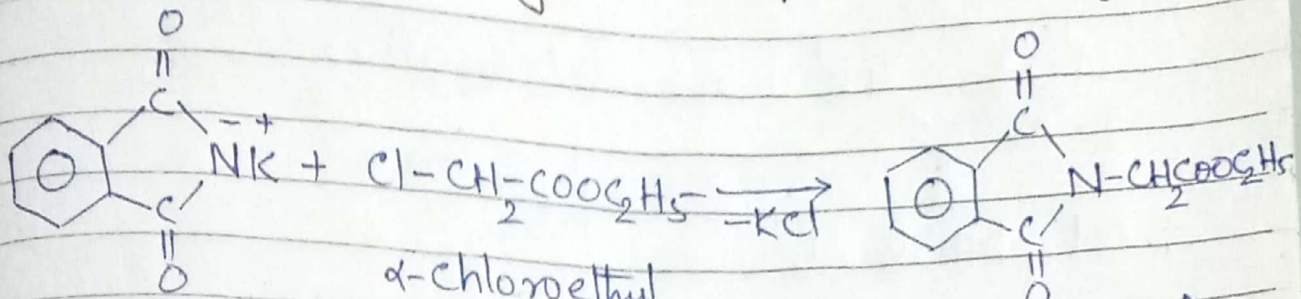


α-Amino acid hydrochloride
(89% yield)

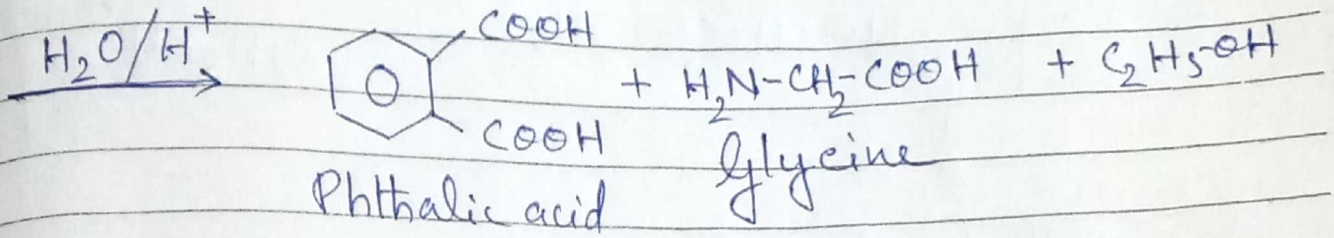
Phthalic acid.

This method results higher and pure yield of amino acids as compared to amination of α-halo acids. Glycine and Leucine are best prepared by this method.

Synthesis of glycine by Gabriel phthalimide synthesis:



Pot. phthalimide — α-Chloroethyl acetate — N-substituted Phthalimide.

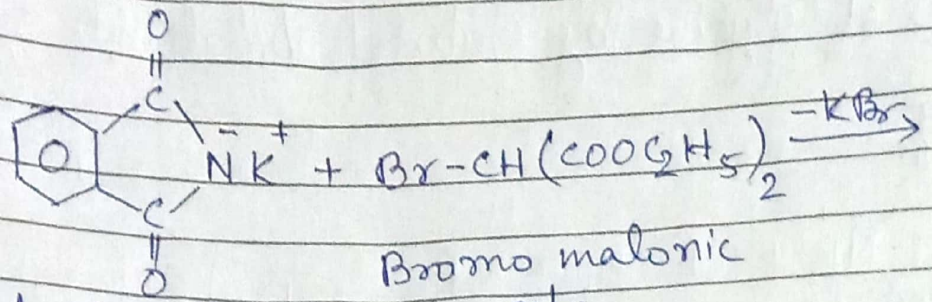


Phthalic acid — Glycine

(4) Phthalimido malonic ester synthesis - It is modification of Gabriel phthalimide method. It involves reaction of potassium phthalimide with α-bromo-malonic ester to produce phthalimidomalonic ester. The sodium salt of ester on reaction with an α-haloester followed by hydrolysis results in the formation of α-amino acid.

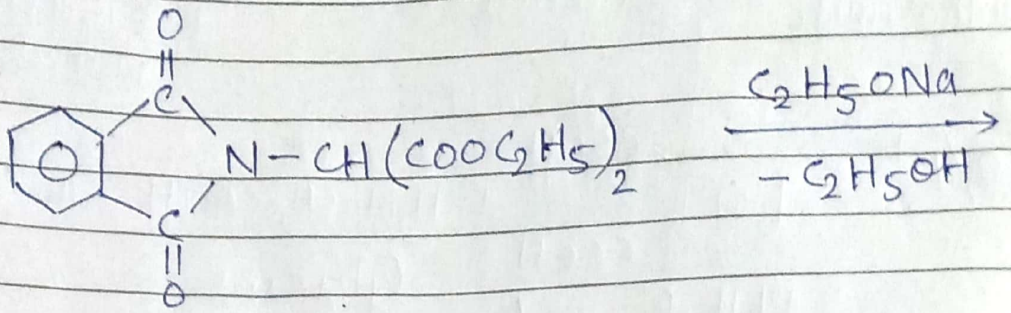
Phthalimido malonic ester synthesis is useful for the synthesis of acidic amino acids and hydroxy amino acids such as serine, glutamic acid and aspartic acid.

Synthesis of aspartic acid from malonic ester

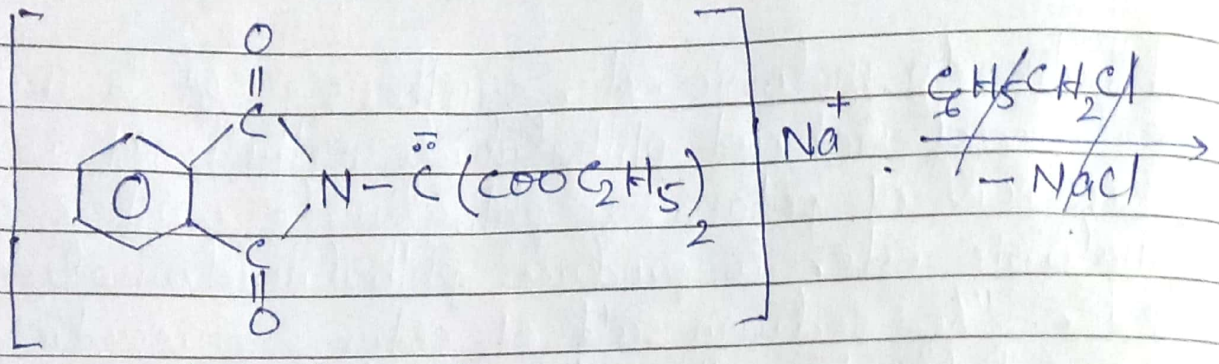


Pot. phthalimide

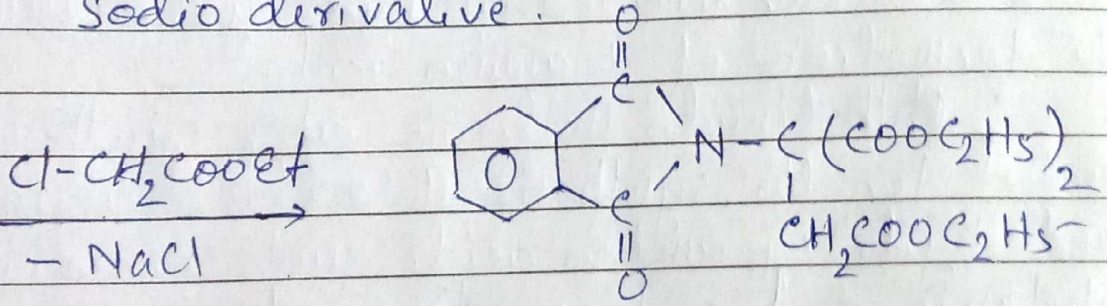
Bromo malonic ester

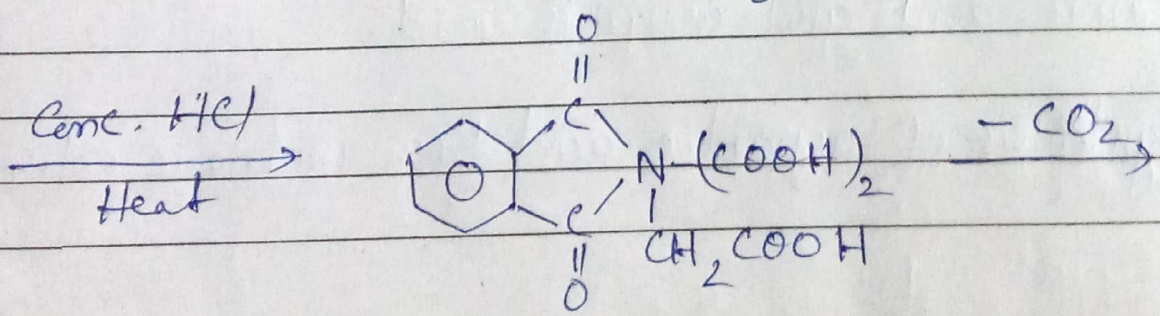


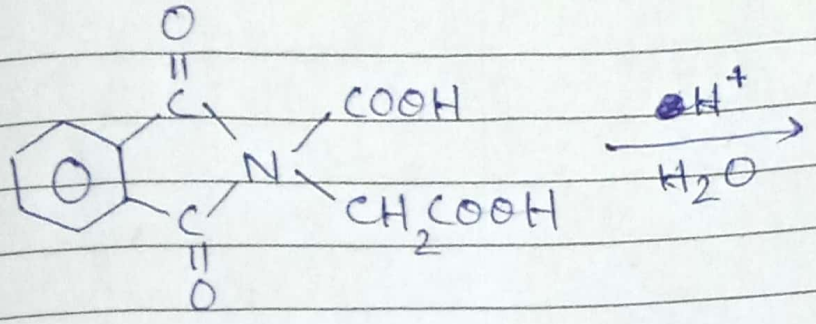
Phthalimido malonic ester.

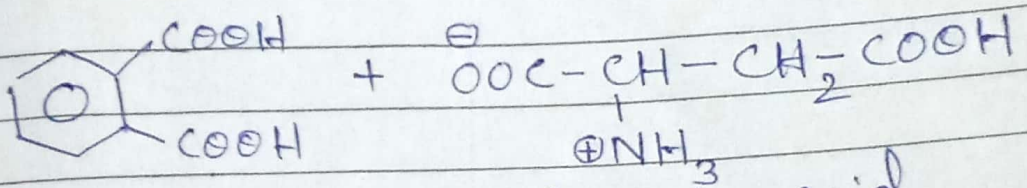


Sodio derivalive.









Aspartic acid.
(43%)