PASSERINI REACTION

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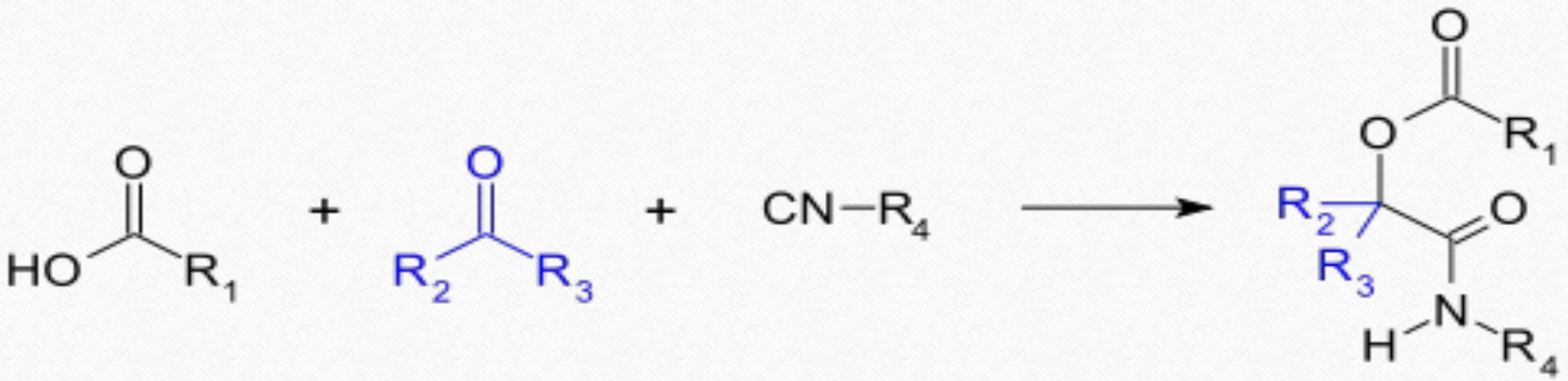
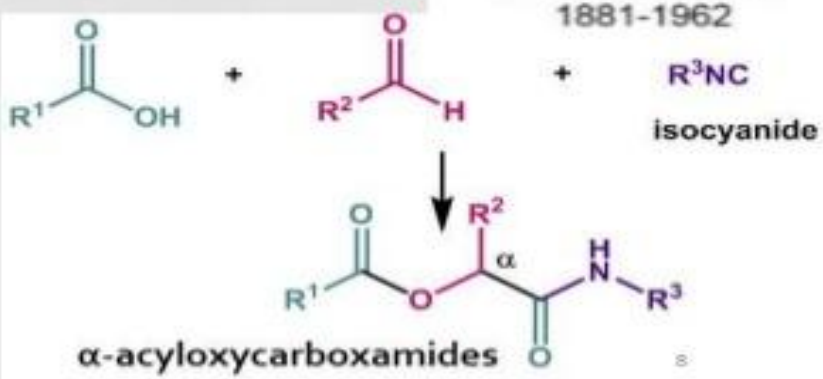
The **Passerini reaction** is a chemical **reaction** involving an isocyanide, an aldehyde (or ketone), and a carboxylic acid to form a α-acyloxy amide. This organic **reaction** was discovered by Mario **Passerini** in 1921 in Florence, Italy. It is the first isocyanide based multi-component **reaction** developed, and currently plays a central role in combinatorial chemistry.


O
HO
R1
+
O
R2
R3
+
CN–R4
O
O
R1
R2
R3
O
N
H
R4

Passerini Reactions

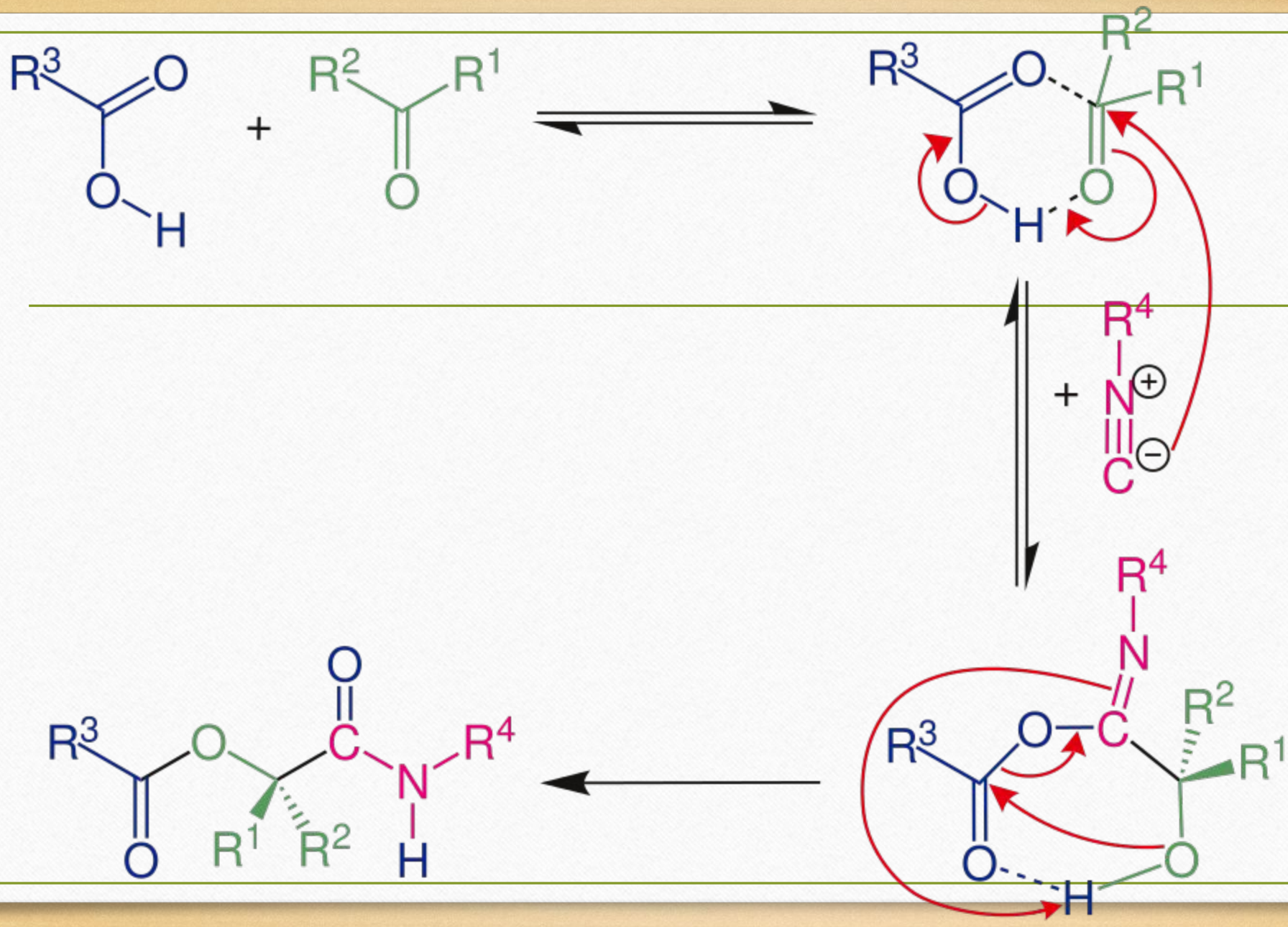
- Simple three component reaction
- Developed by **Mario Passerini**
- Product is acyloxy amide
- It involves an oxo component, an isocyanide and an acid in a single step

1881-1962



Passerini three-component reaction under catalytic aerobic conditions allows the conversion of alcohols instead of aldehydes.

The reaction of alcohols, isocyanides, and carboxylic acids in toluene in the presence of a catalytic amount of cupric chloride, NaNO 2, and TEMPO afforded, under an oxygen atmosphere,...

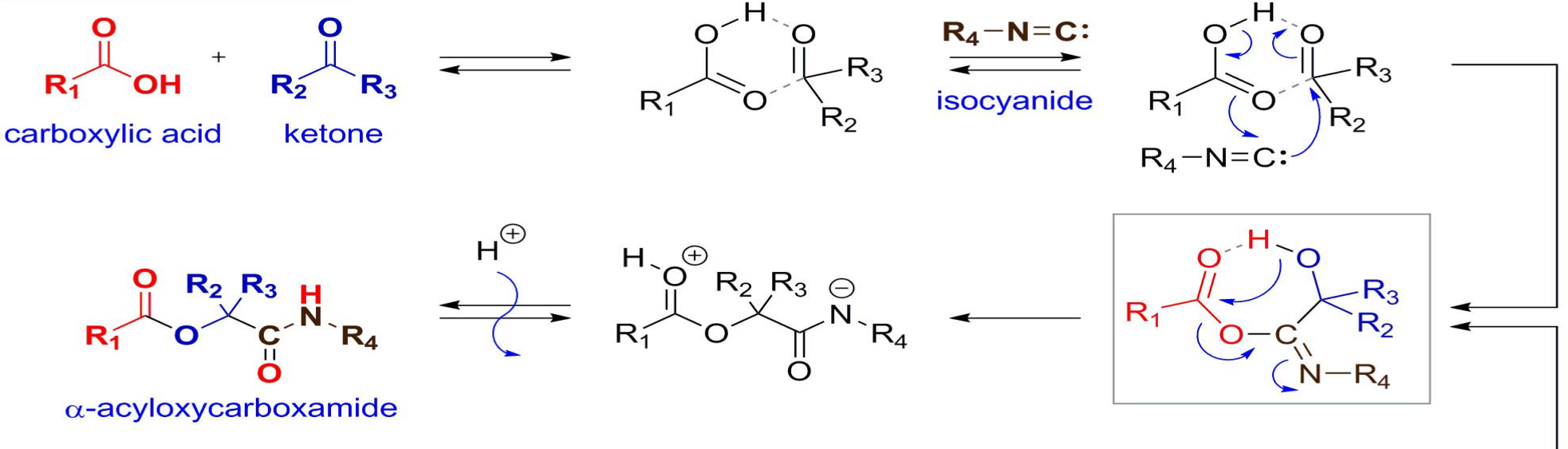

R3
O
O
H
+
R2
R1
O
R2
R3
O
R1
O
O
H
+
R4
N
C
R4
N
R3
O
C
R2
R1
O
O
H
O
R3
O
C
N
R4
O
R1
R2
H

Passerini Reaction

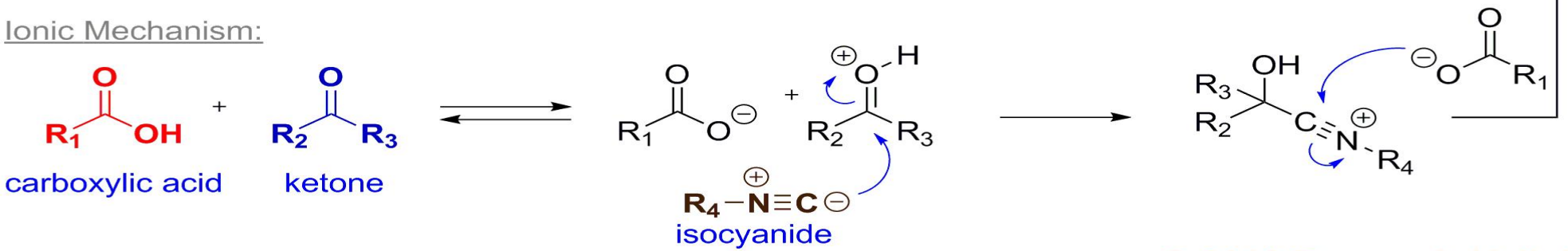
3-Component Reaction (3-CR)

[1921]

Concerted Mechanism:



Ionic Mechanism:

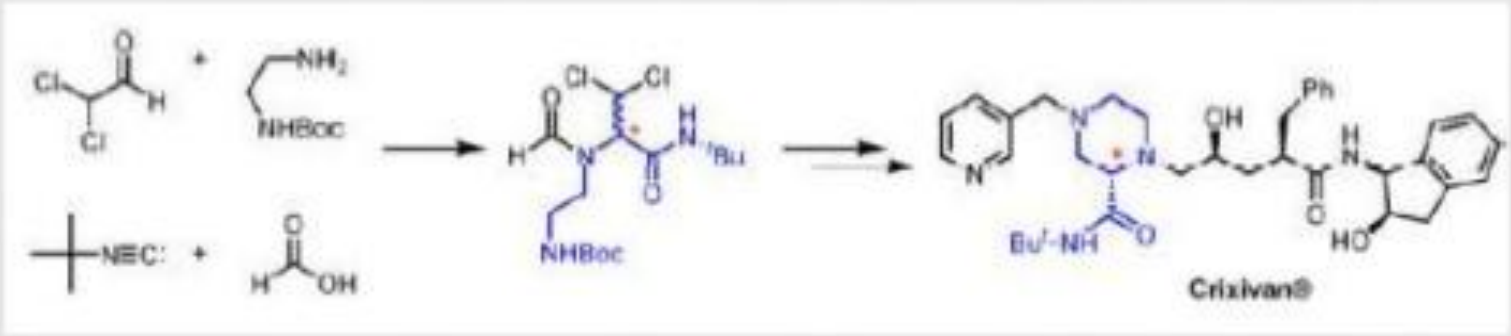


Conclusion

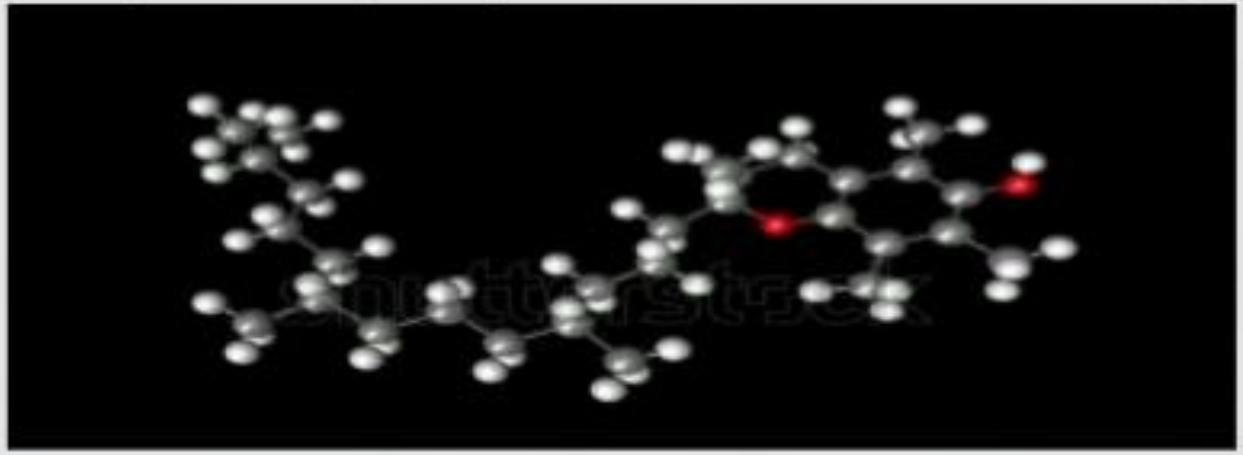
- The passerini reaction is a pivotal isocyanide-based MCR—that contribute to huge number biologically active α-acyloxyamides.
- Some interesting targets were synthesized following this MCR as a key synthetic step.
- Additionally, some environmentally benign protocols have been remarked and more improvements in this respect are expected in the next years with the increasing concern about the sustainability of the processes.

α-Hydroxyamides

- The hydrolyzed products of Passerini reactions
- Common organic building blocks for natural products and drugs
- Modification of Passerini reaction , called the Ugi reaction, that uses imines instead of aldehydes was investigated by process chemists at Merck as a method for synthesizing the antiretroviral drug, Crixivan®



- These reactions are powerful synthetic methods for the synthesis of structurally diverse molecules
- The importance and application of these reactions can be further increased by post-condensation and transformations
- These modifications are usually accomplished by using a suitable functional group and take place spontaneously or upon treatment with additional reagents



THANK YOU