

Universidad Nacional Autónoma de México

Química Orgánica IV (1606)

Laboratorio

Semestre 2026 - 2

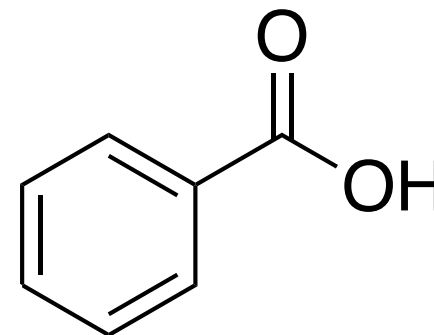


M. en C. Arturo García Zavala

Práctica 2

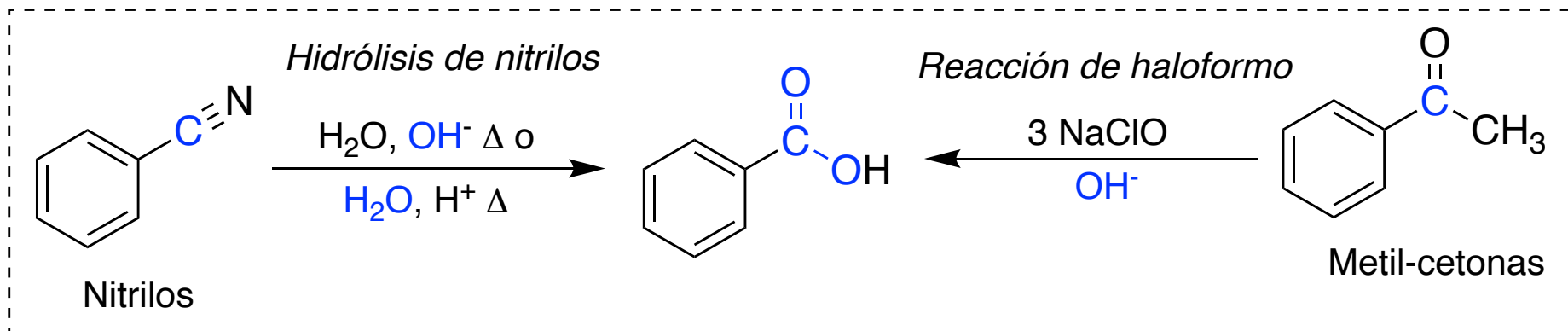
Ácidos carboxílicos II

Reacción de haloformo

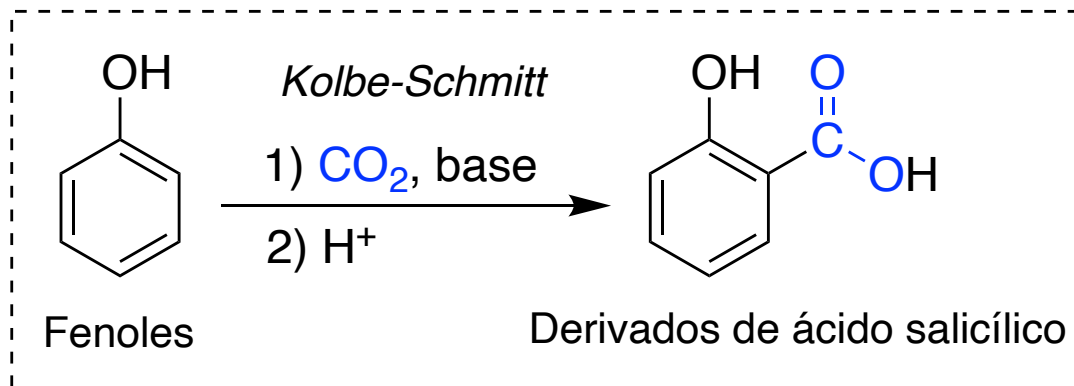
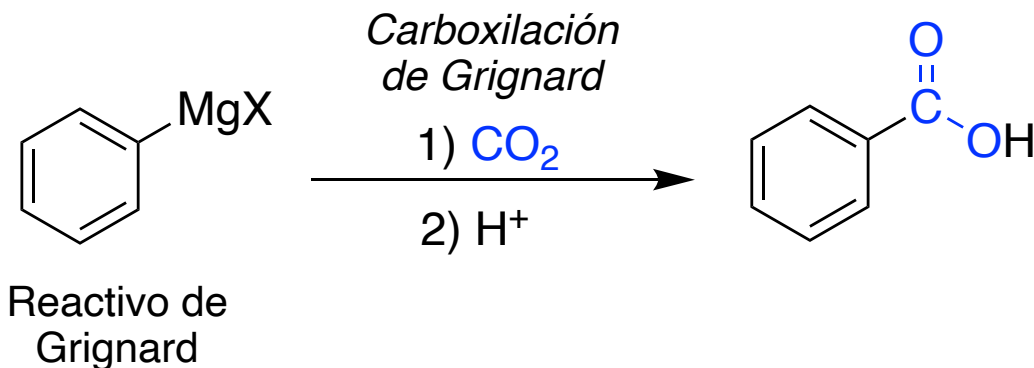


23/02/2026

Síntesis de ácidos carboxílicos



**Laboratorio
de QO IV**



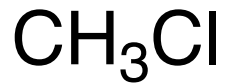
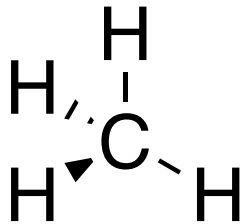
Haloformos



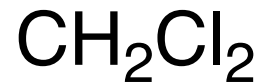
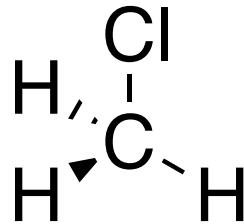
X: Halógeno



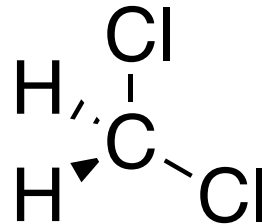
Metano



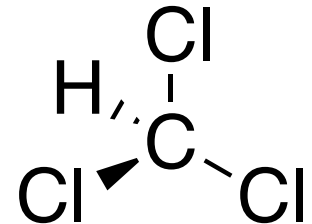
Clorometano



Diclorometano



Triclorometano



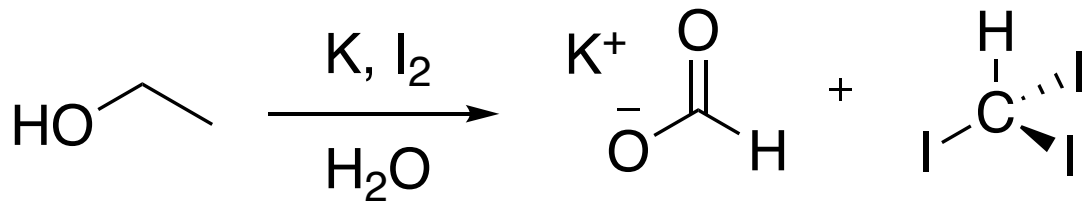
Cloroformo

Reacción del haloformo



Georges-Simon Serullas
(1774 - 1832)

1822



Obtención de yodoformo

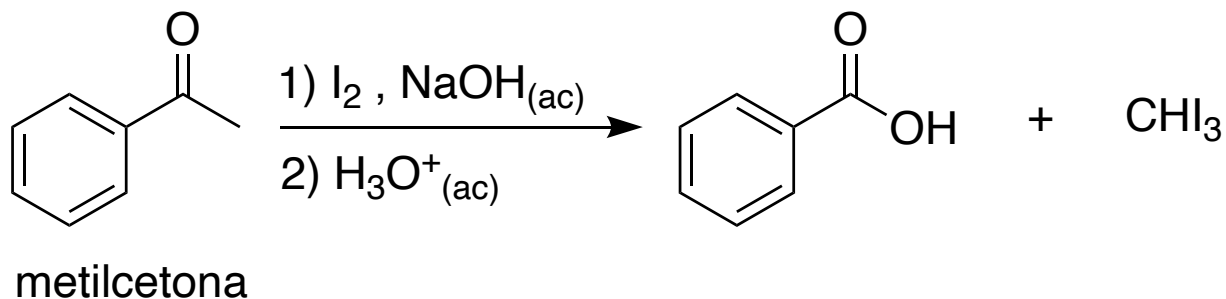
G.-S. Serullas, Ann. Chim. Phys. 1822, 20, 165–166.

Reacción del haloformo

1870's



Adolf Lieben
(1836 - 1914)



Aplicación en síntesis

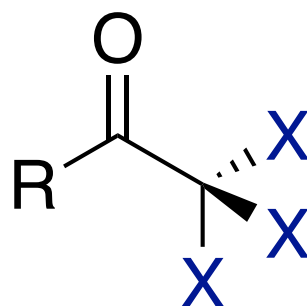
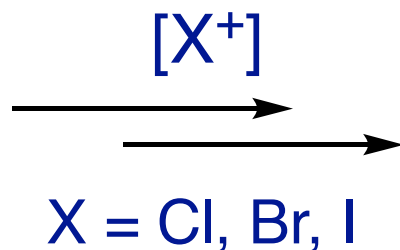
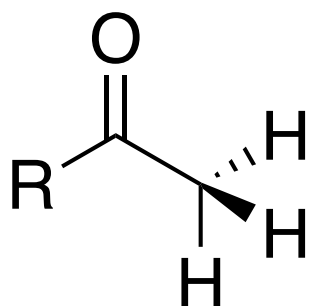
G.-S. Annalen der Chemie. Supplementband. 7: 218–236.

Reacción del haloformo

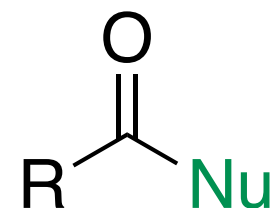
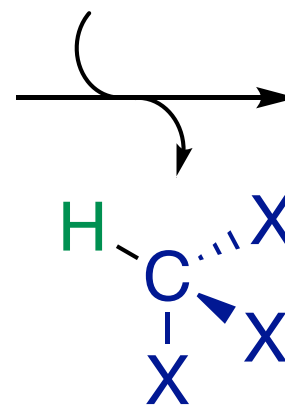
Desmetilación oxidativa de metilcetonas

Metilcetona

Fuente de halógeno
[X⁺]



Nu-H



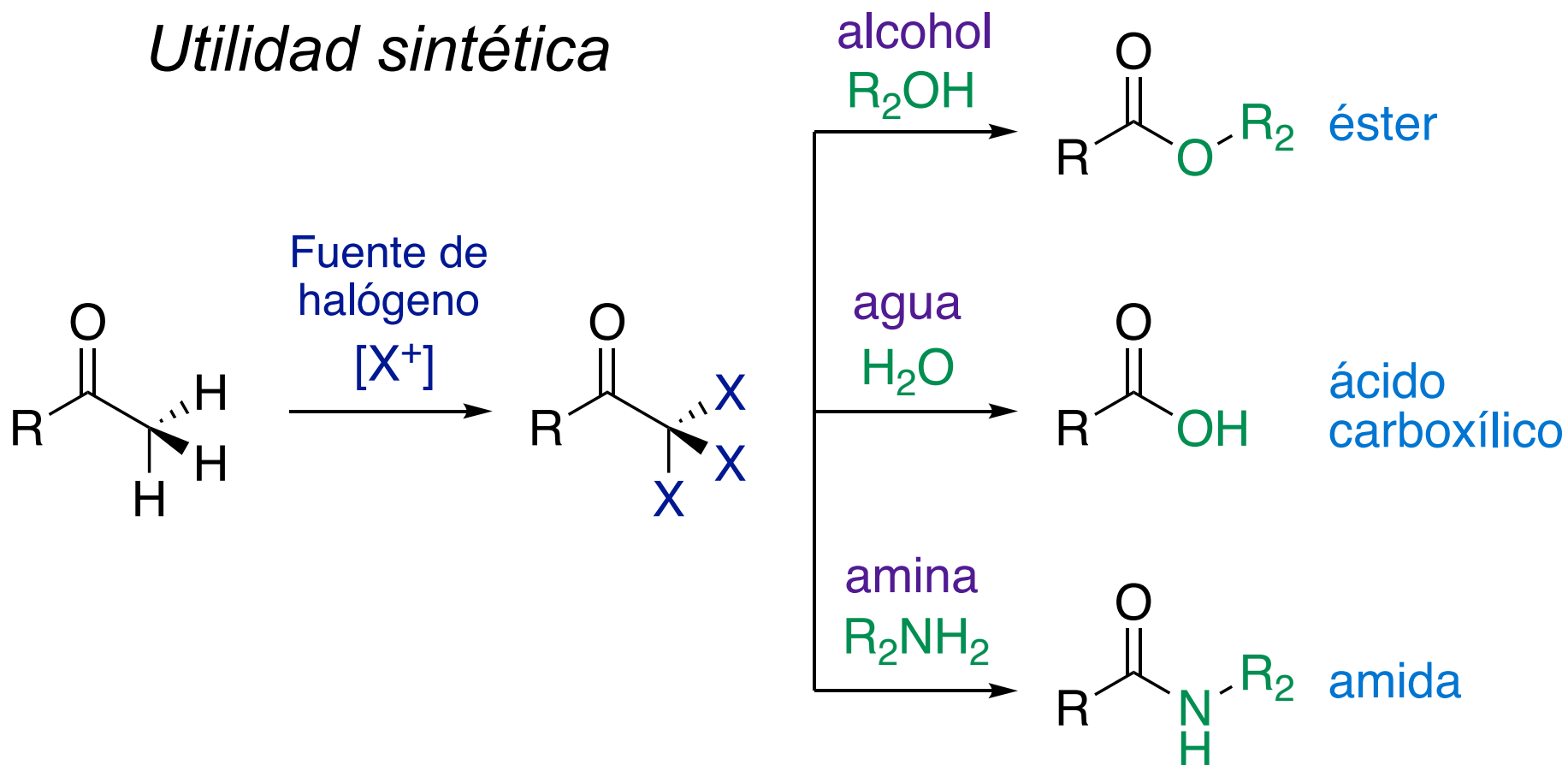
Polihalogenación de la posición α

Haloformo

Chem. – A Eur. J. **2024**, 30 (71), e202403045.

Reacción del haloformo

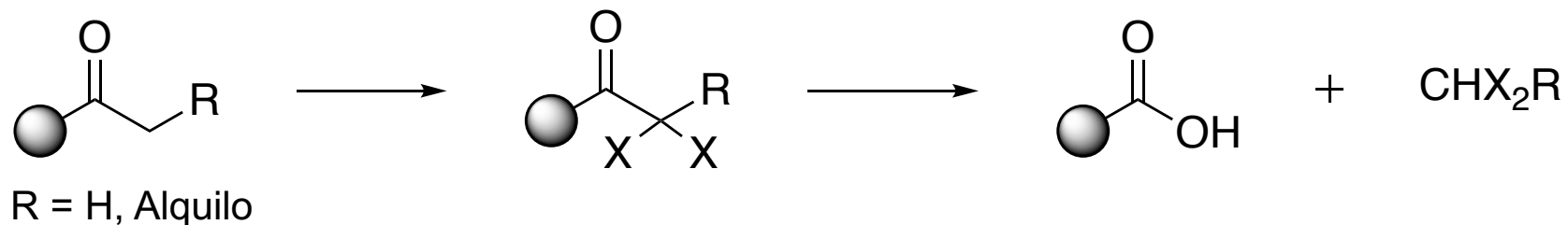
Utilidad sintética



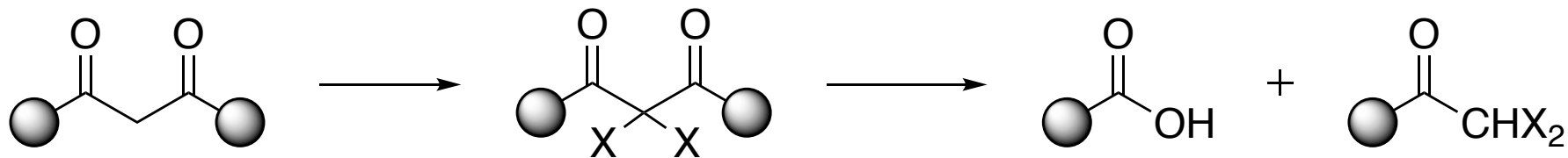
Chem. – A Eur. J. **2024**, 30 (71), e202403045.

Utilidad sintética

alquilcetonas



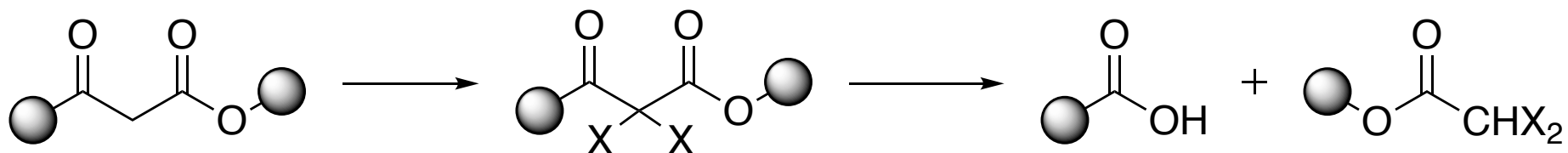
1,3-dicetonas



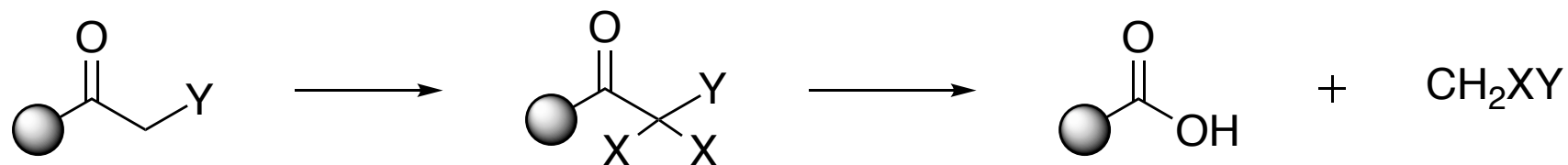
Chem. – A Eur. J. **2024**, 30 (71), e202403045.

Utilidad sintética

β -cetoésteres



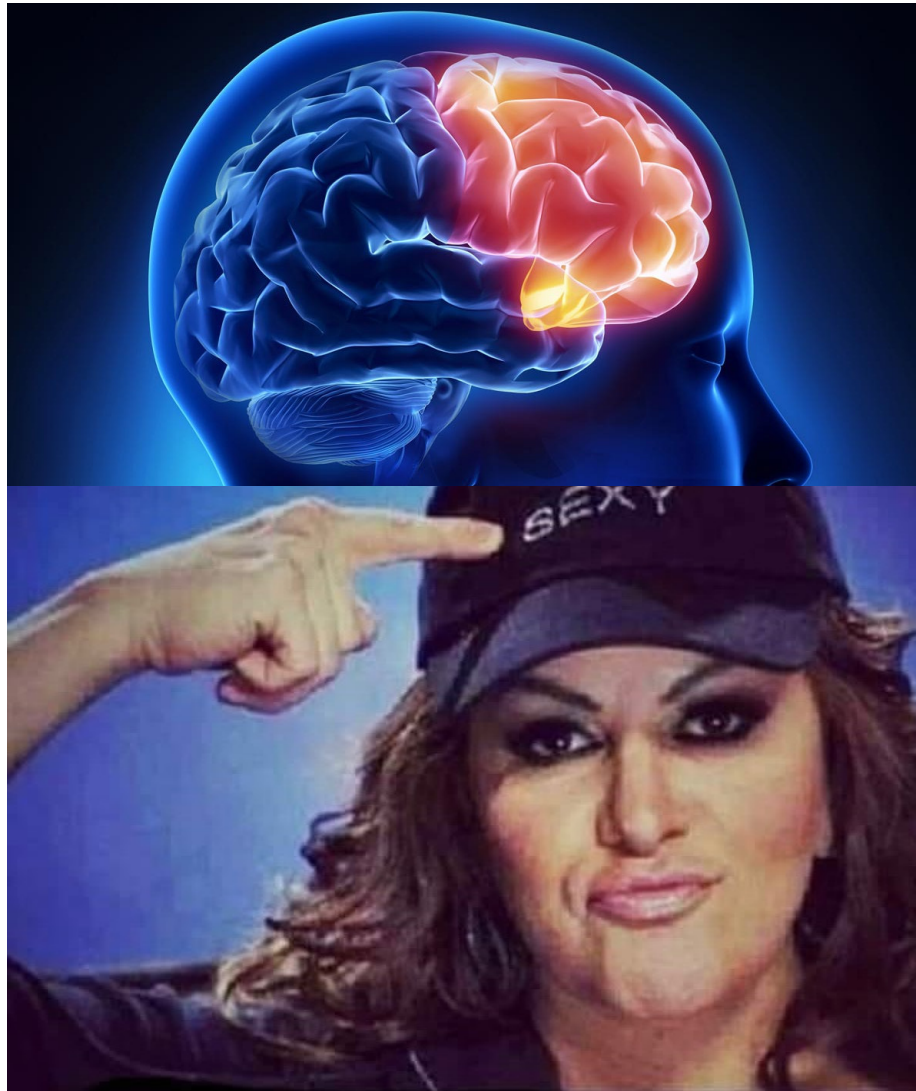
α -nitro/arilcetonas



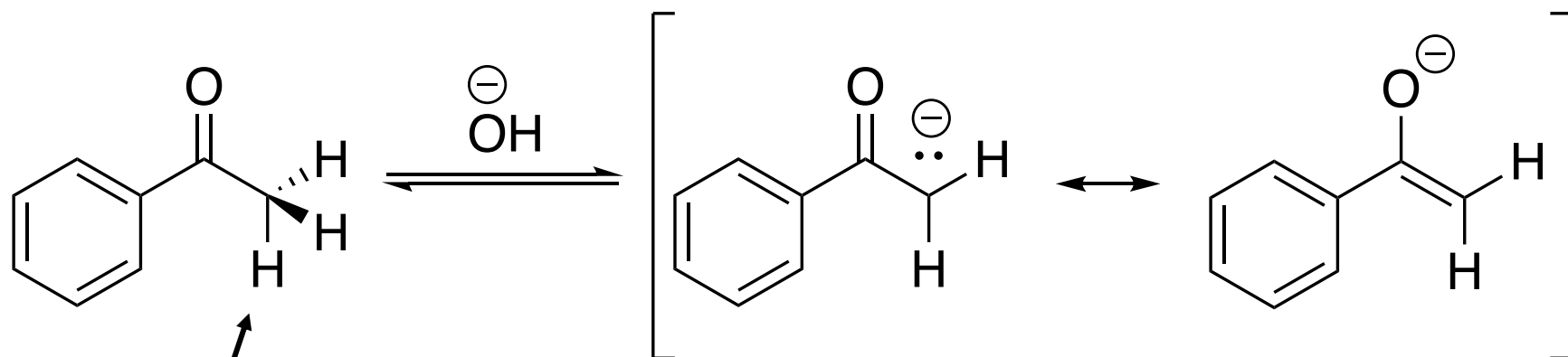
Y = NO_2 , Arilo

Chem. – A Eur. J. **2024**, 30 (71), e202403045.

Actividad de activación de lóbulo frontal



Desprotonación del carbono alfa (α)



$\text{p}K_a = 18.4$

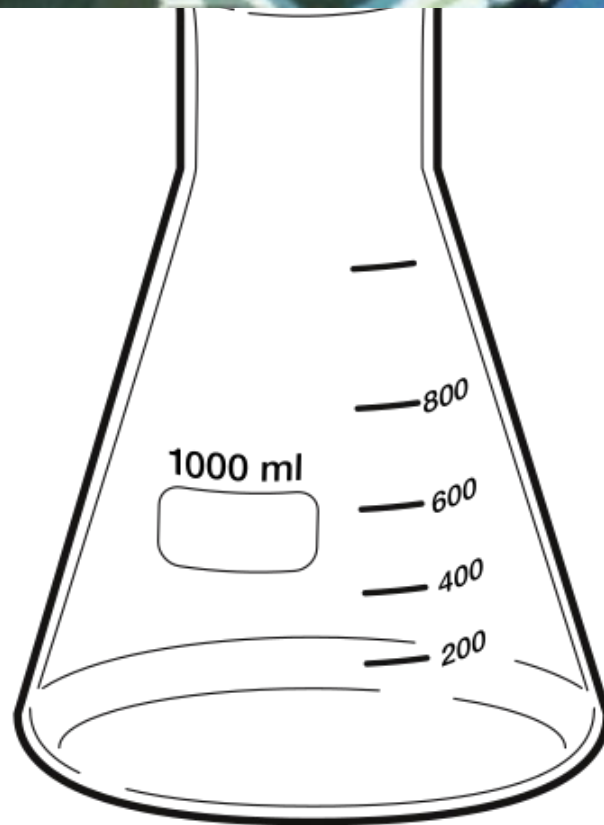
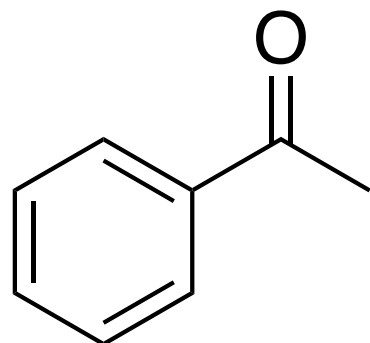
Enolato

Estabilizado por resonancia

¿De dónde viene el hidróxido?

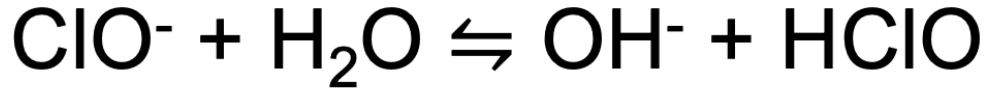


Can. J. Chem. **1987**, 65 (9), 2154–2159.



NaClO

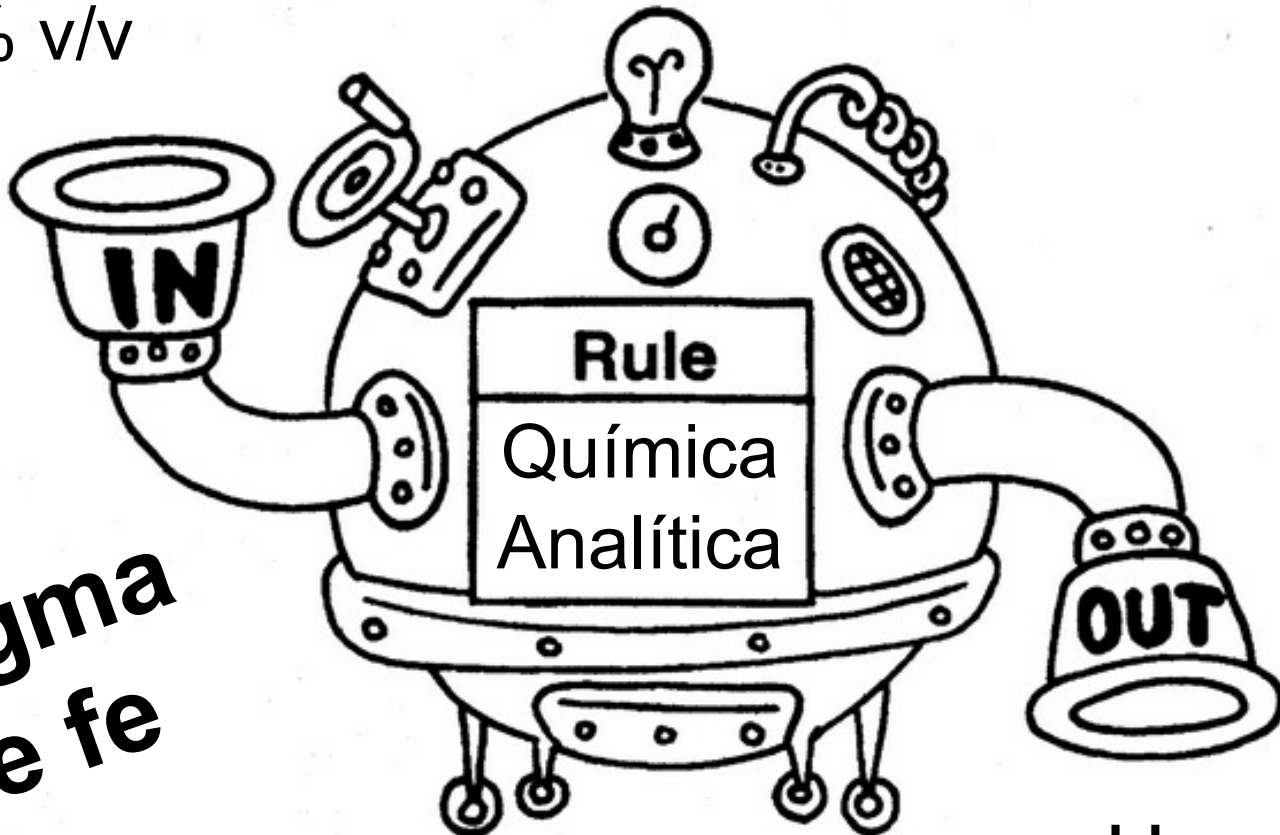
H₂O



$\text{p}K_a = 7.54$

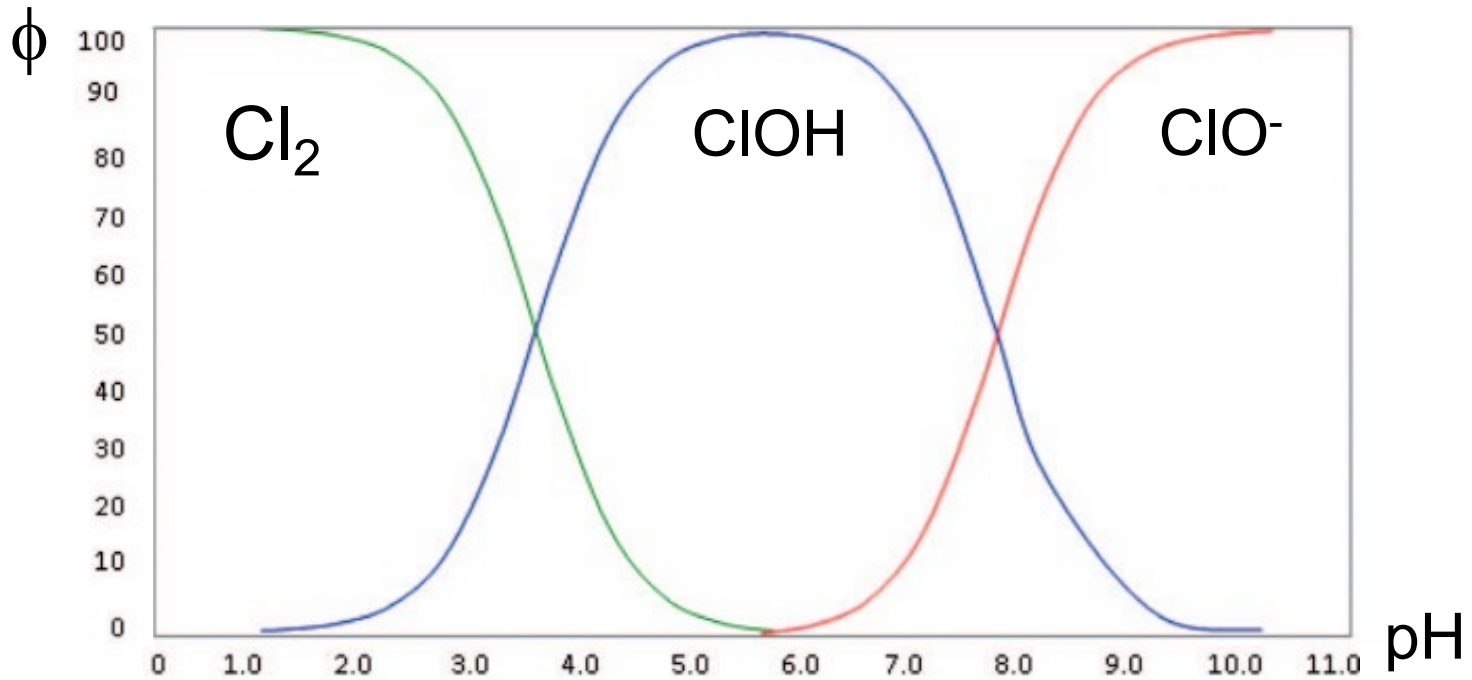
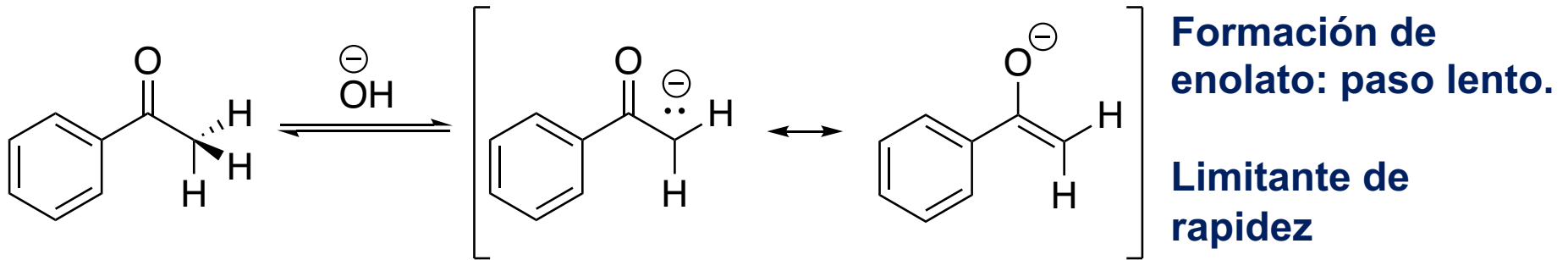
13 % v/v

**Dogma
de fe**



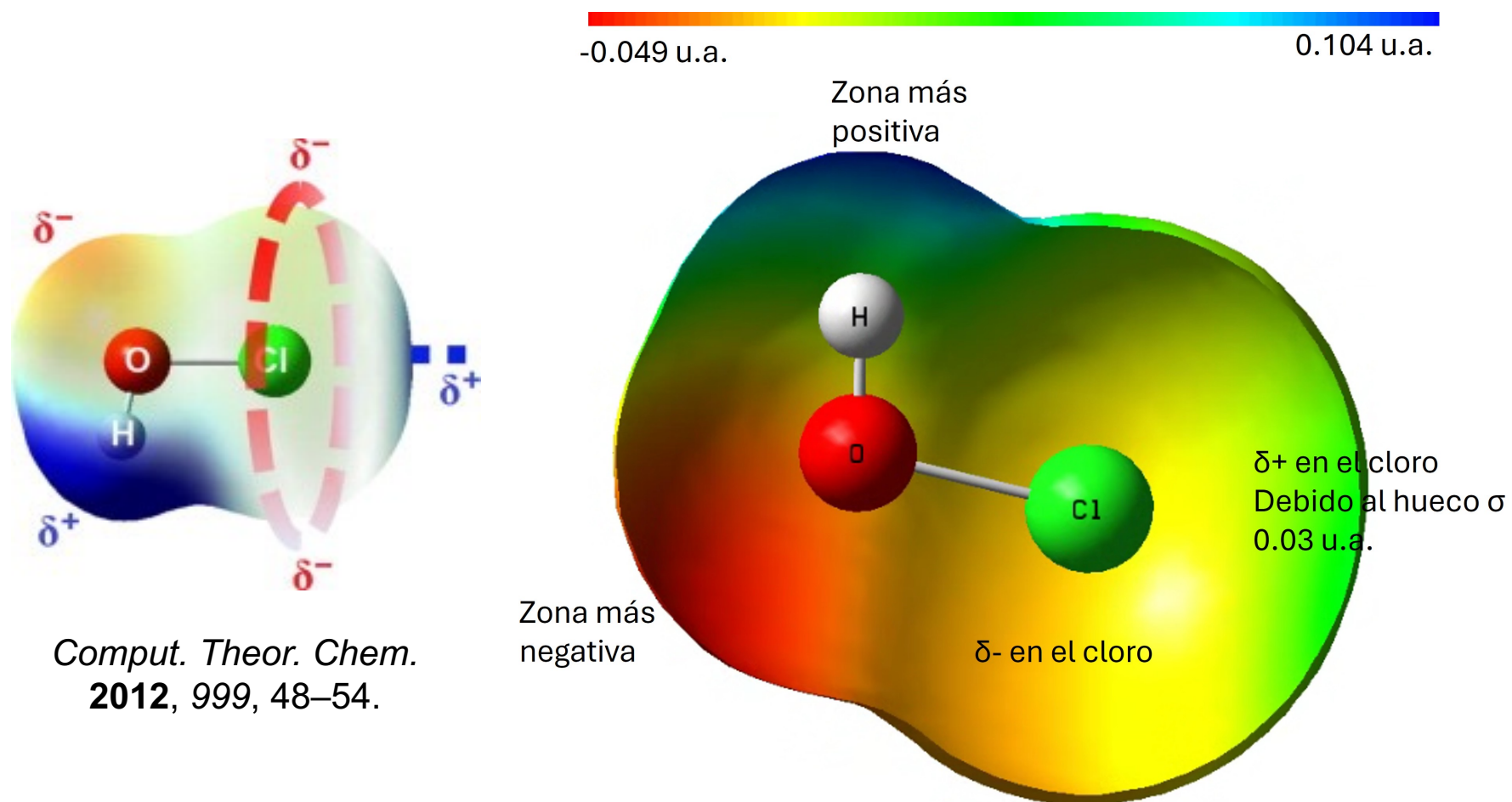
$\text{pH} = 11$

Mecanismo



Adaptado de: *J. Food Prot.* **2017**, 80 (2), 312–330.

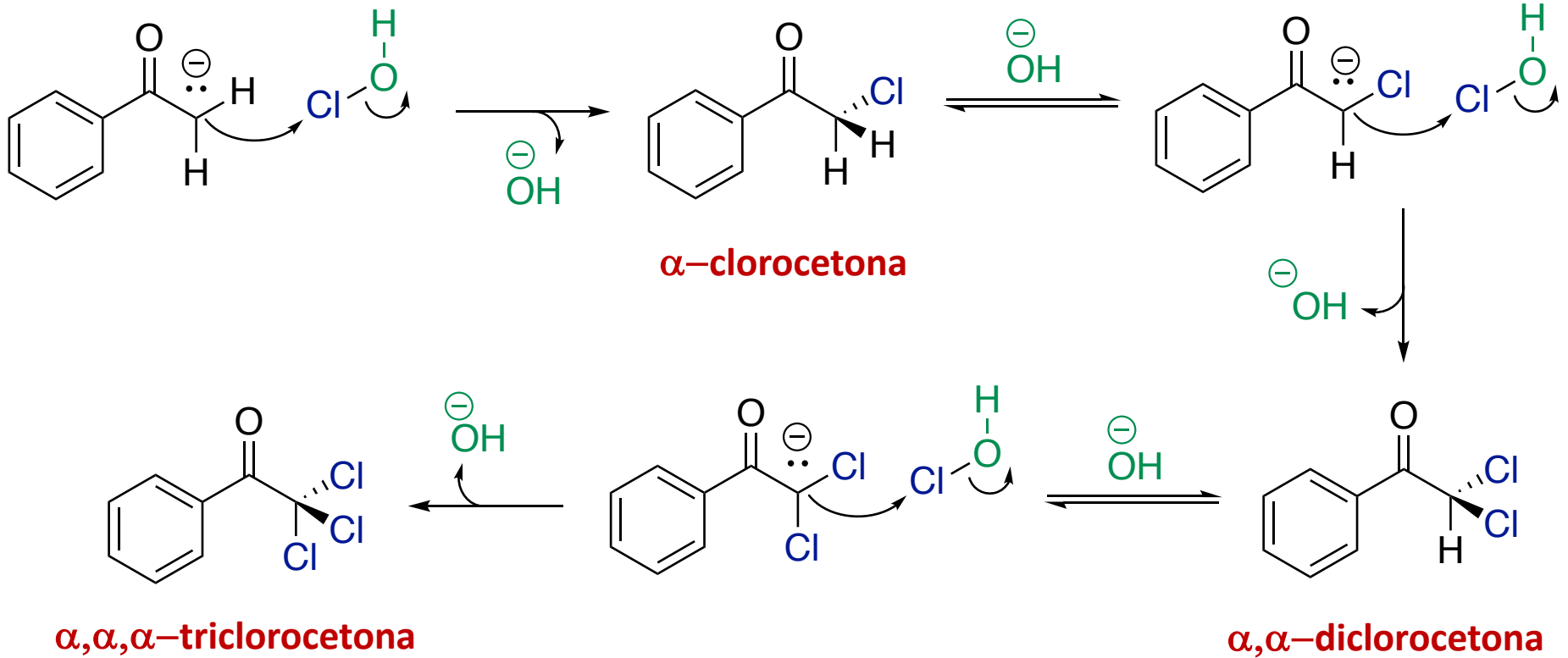
Hueco sigma y mapa de potencial electrostático

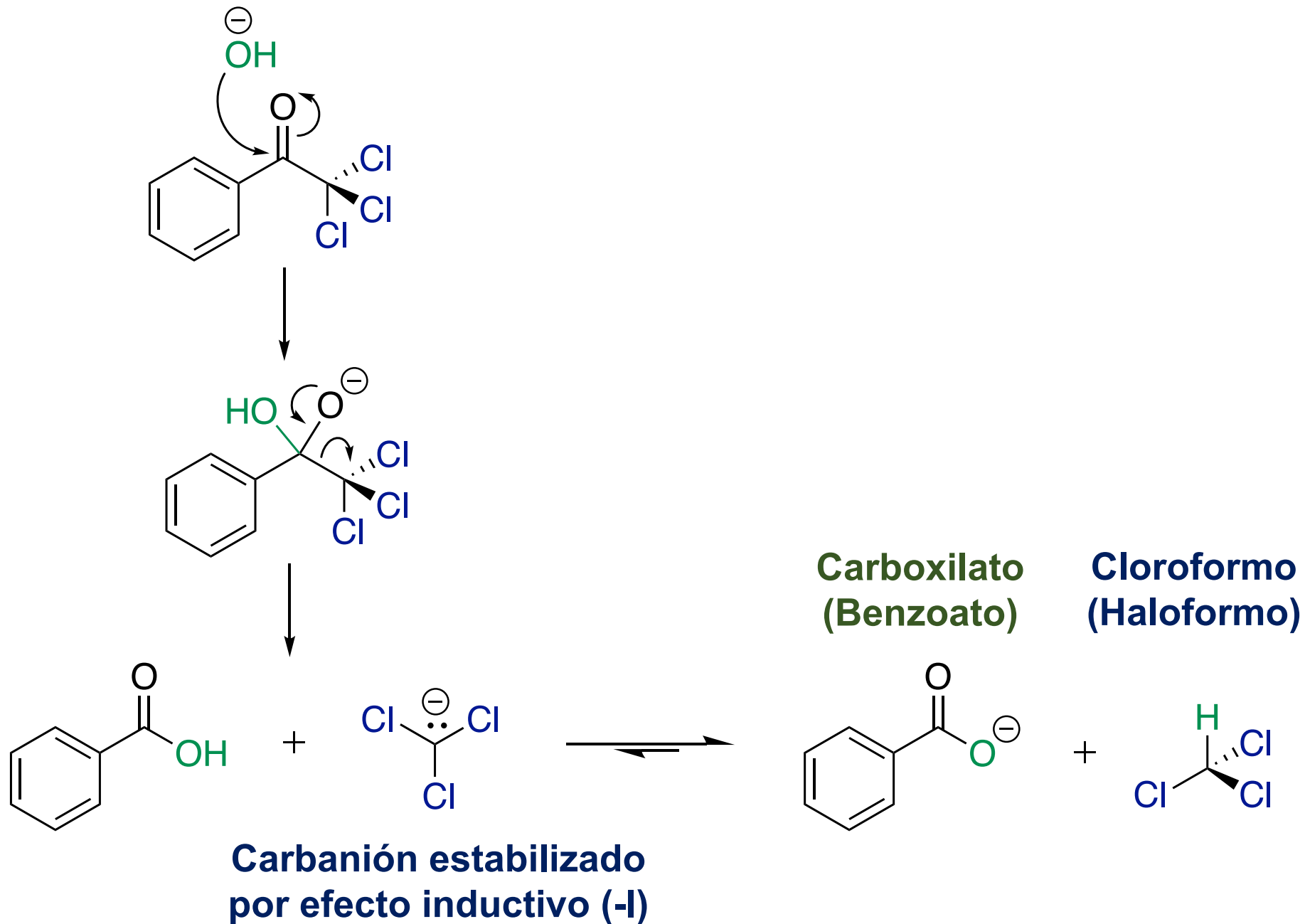


Comput. Theor. Chem.
2012, 999, 48–54.

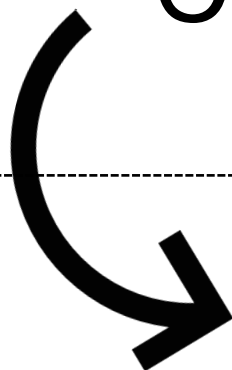
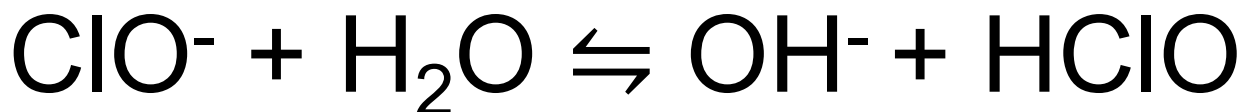
Calculado por el profesor Oscar González Antonio

Mecanismo





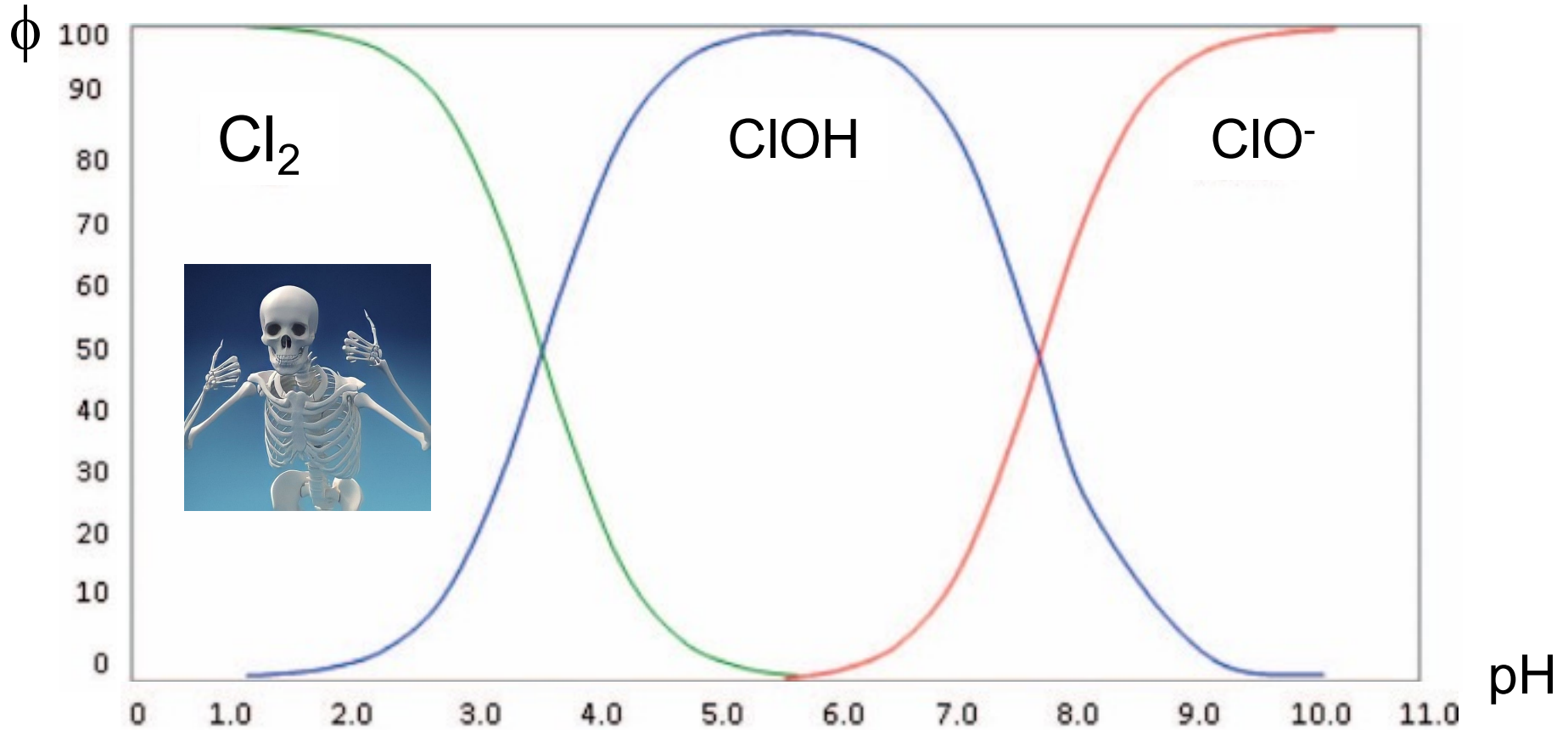
Las disoluciones de hipoclorito
no se calientan



Se favorece su dismutación

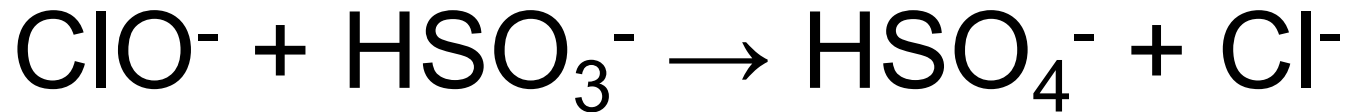
Cotton, F. A.; Wilkinson, G. *Advanced Inorganic Chemistry: A Comprehensive Text*; 3rd ed.; Interscience Publishers: New York, 1972; p 477.

Diagrama de predominio de especies



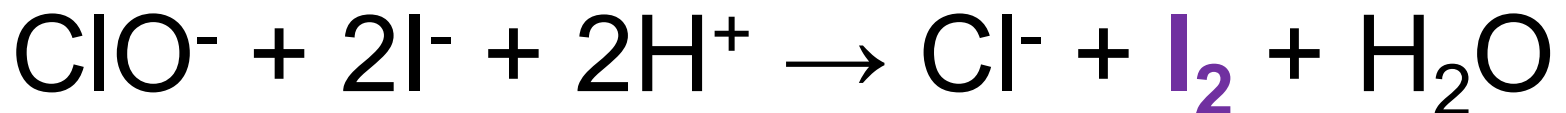
Adaptado de: *J. Food Prot.* **2017**, 80 (2), 312–330.

-Neutralización del hipoclorito remanente

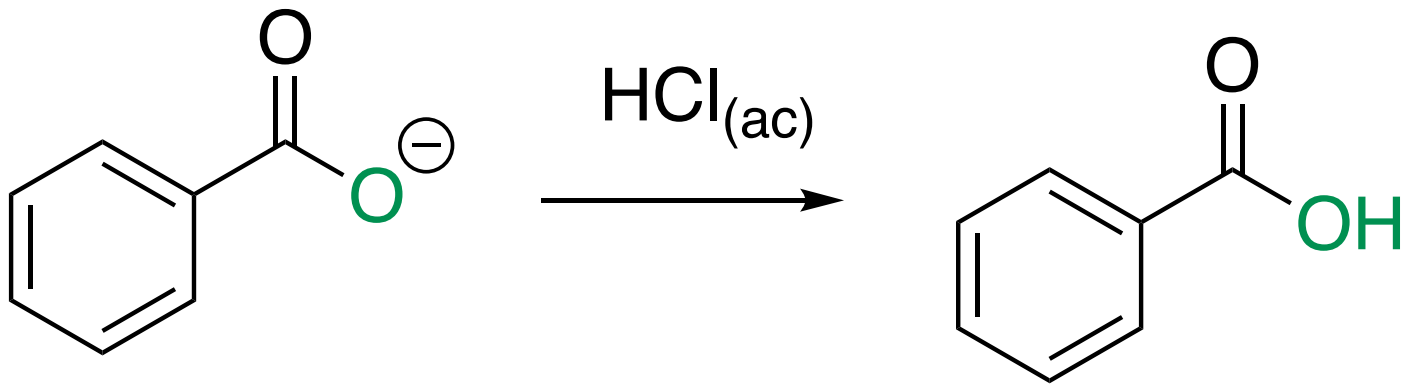


-Prueba con disolución ácida de KI

Reacción positiva (ClO^- remanente)



**Color
marrón**



**Benzoato
(Carboxilato)**

**Ácido
benzoico**