

UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO
PROGRAMA DE MAESTRÍA Y DOCTORADO EN CIENCIAS QUÍMICAS
SÍNTESIS ORGÁNICA

Enantioselective Total Synthesis of Lycopodine

Síntesis total enantioselectiva de licopodina

ESTEBAN RAMOS

Contenido de la presentación

1

- Antecedentes

2

- Aportes

3

- Mecanismos de reacción

4

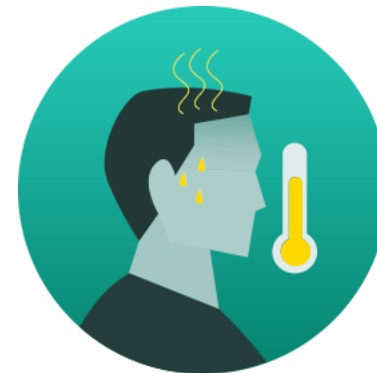
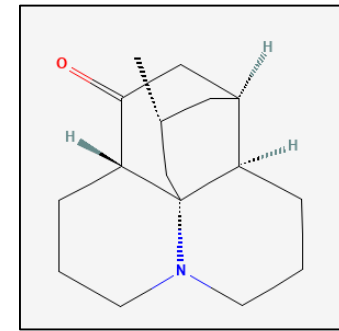
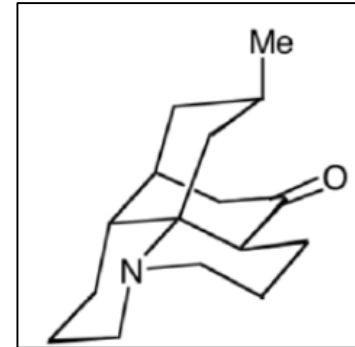
- Conclusiones

5

- Bibliografía

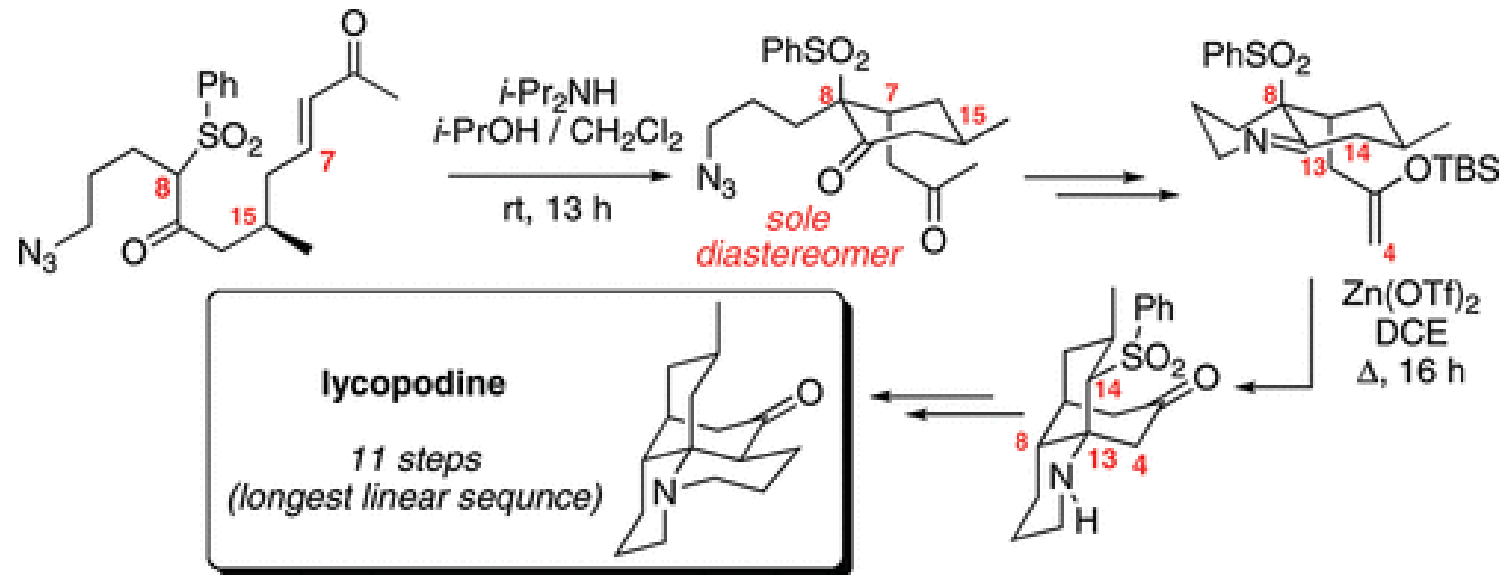
Antecedentes

- Ampla actividad biológica y complejidad estructural.
- Aislada hace 125 años por Bodeker.
- Alcaloides *lycopodium*
- Propiedades: antipiréticas y actividad anticolinesterasa.
- Hasta la fecha, 7 síntesis racémicas totales y dos síntesis racémicas formales de lycopodina han sido reportadas.



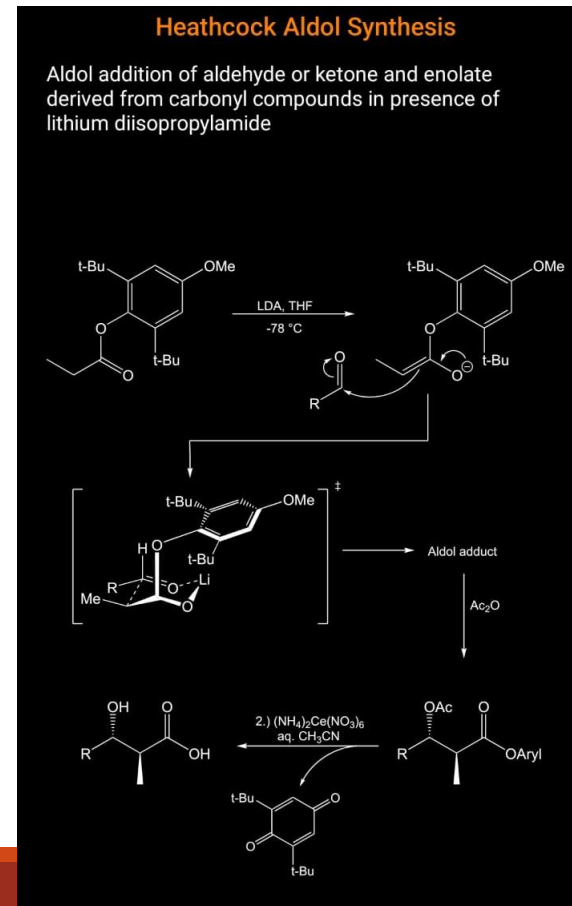
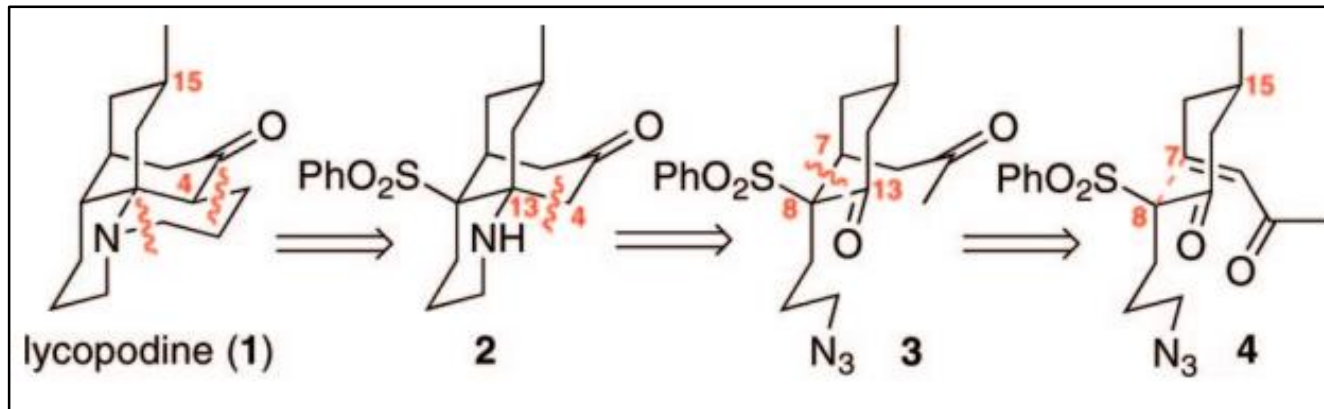
Aportes

La primera síntesis total enantioselectiva

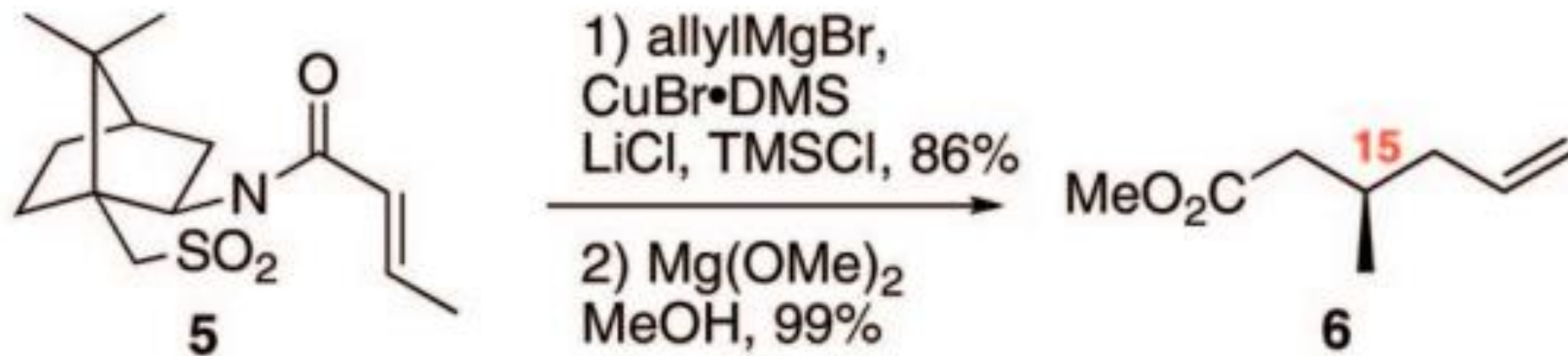


Análisis retro sintético

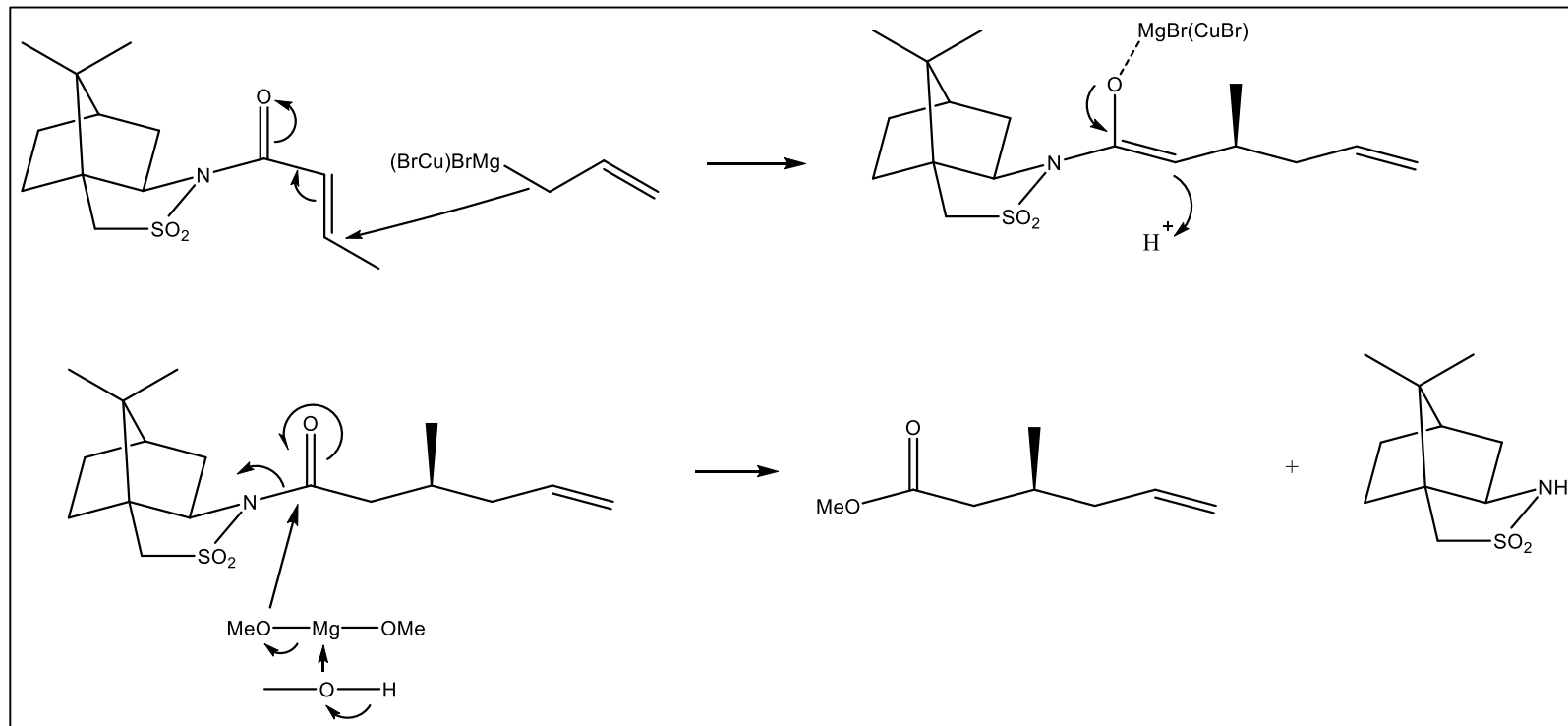
- Adición intramolecular diastereoselectiva de Michael de 4 Inspirado en Heathcock.
- Ciclización de Mannich para formar triciclo 2.

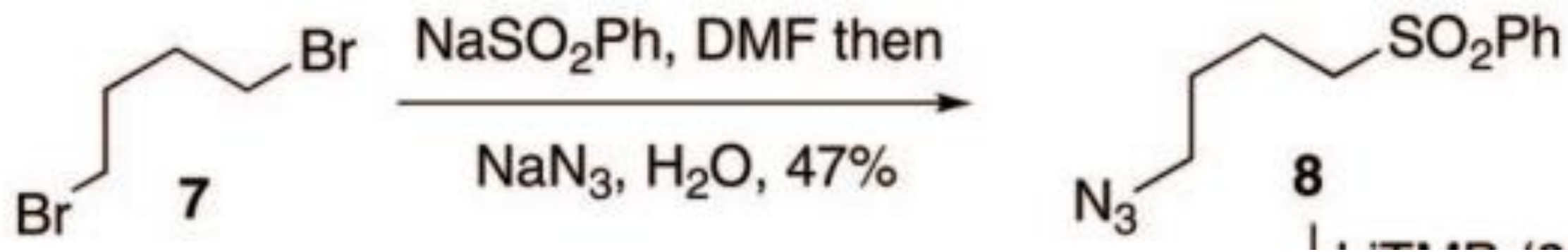


Mecanismos de reacción involucrados en la síntesis

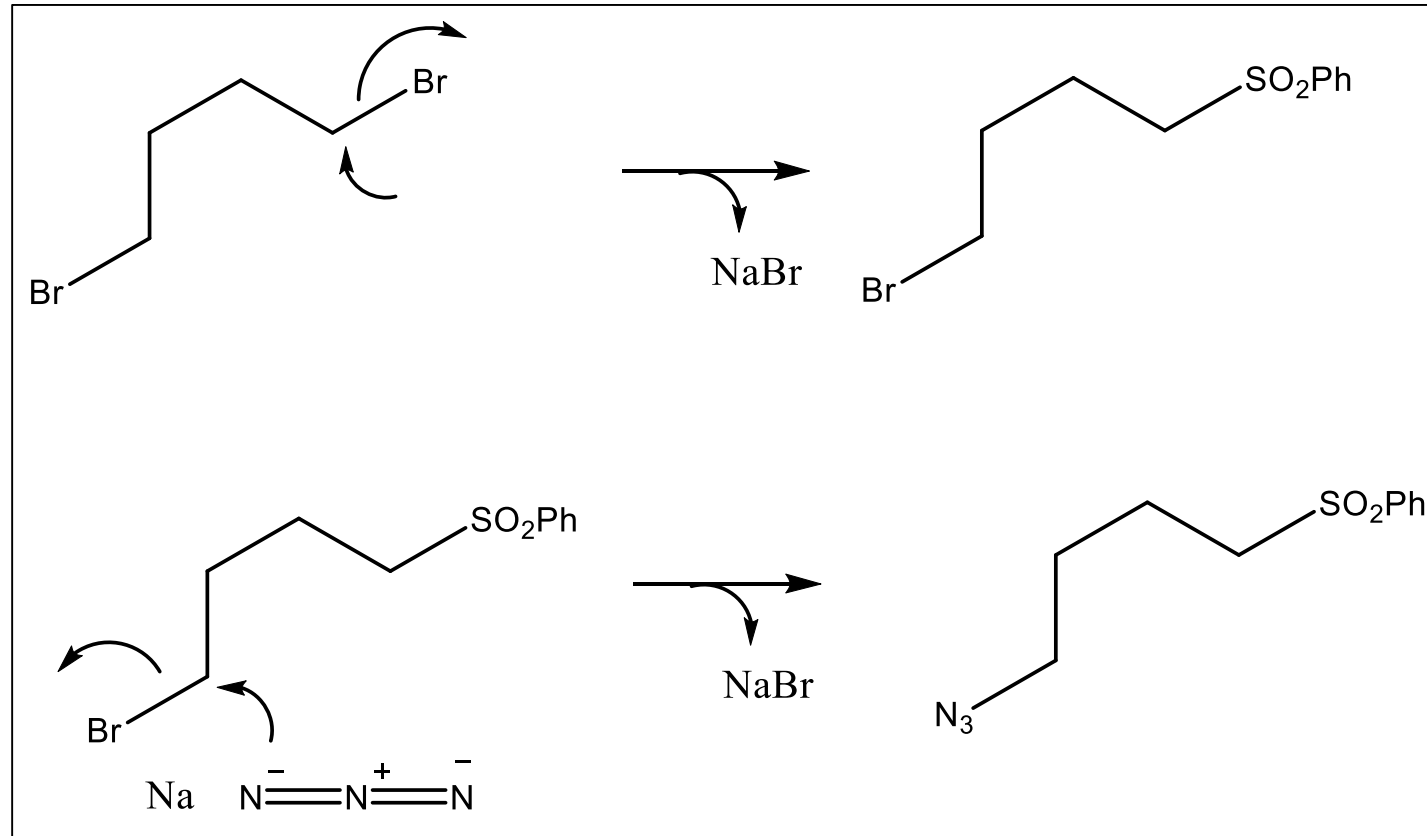


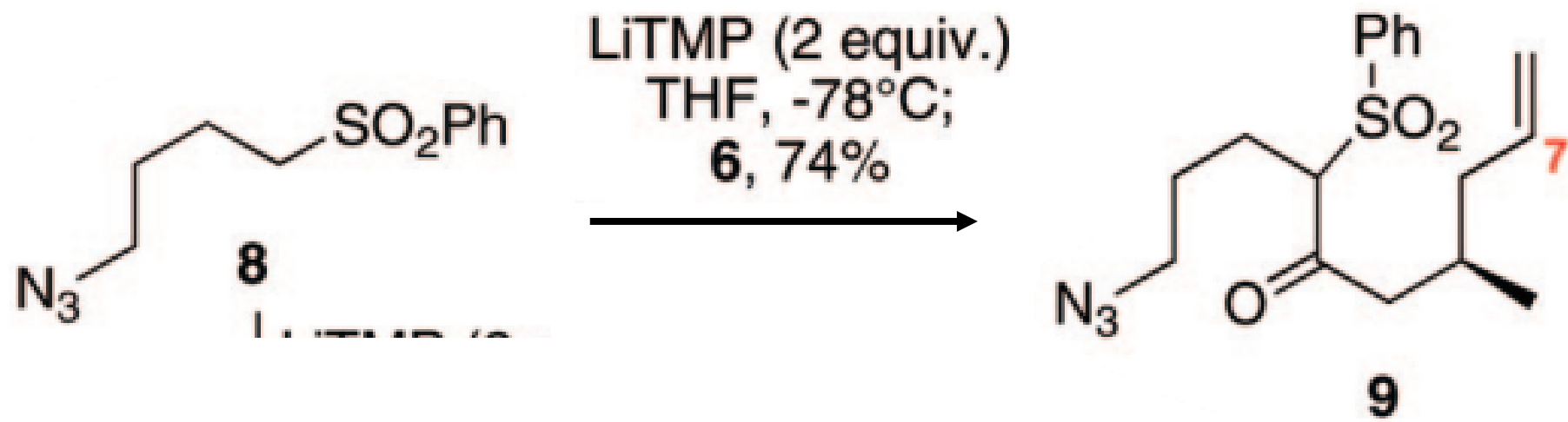
Mecanismo

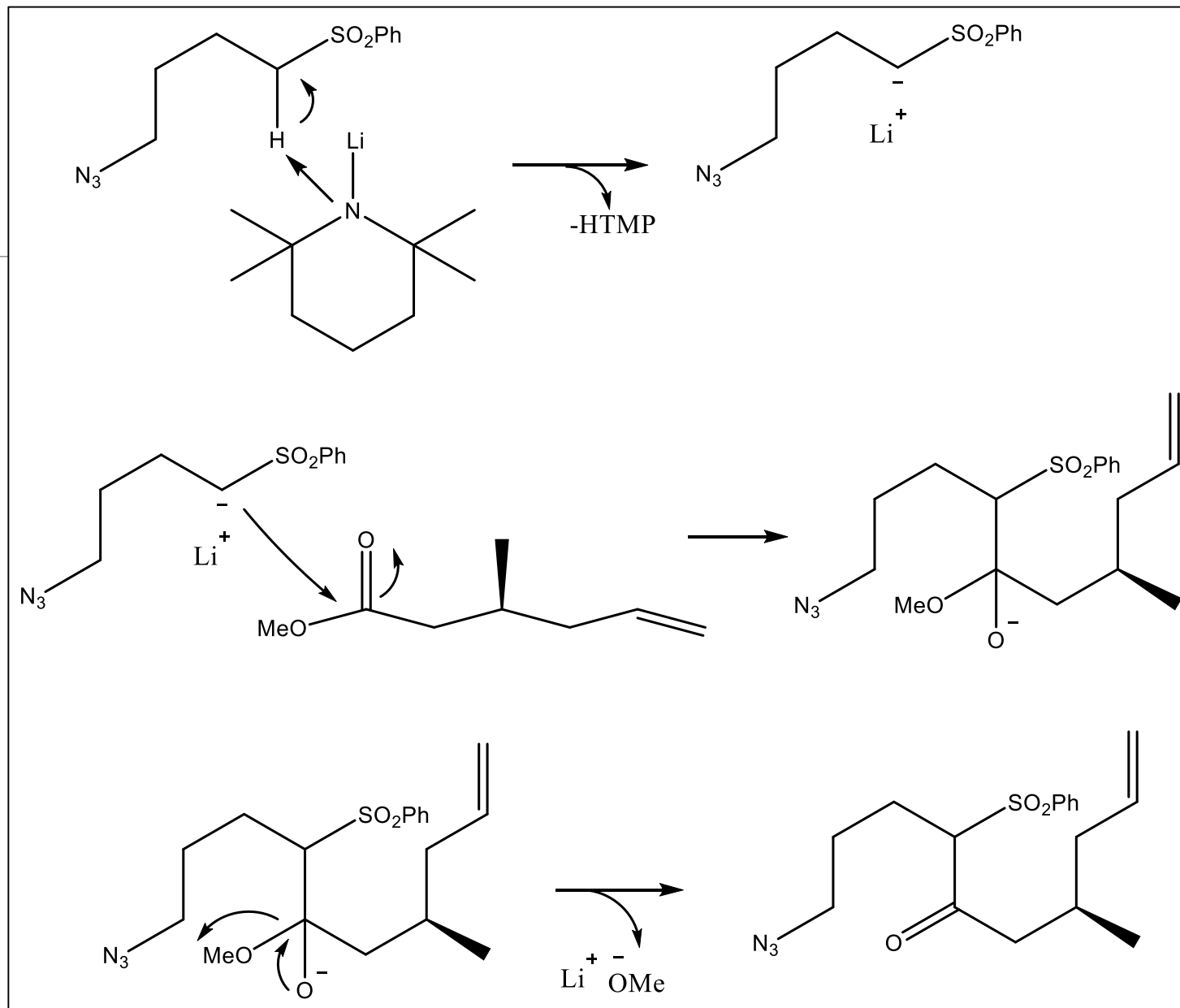


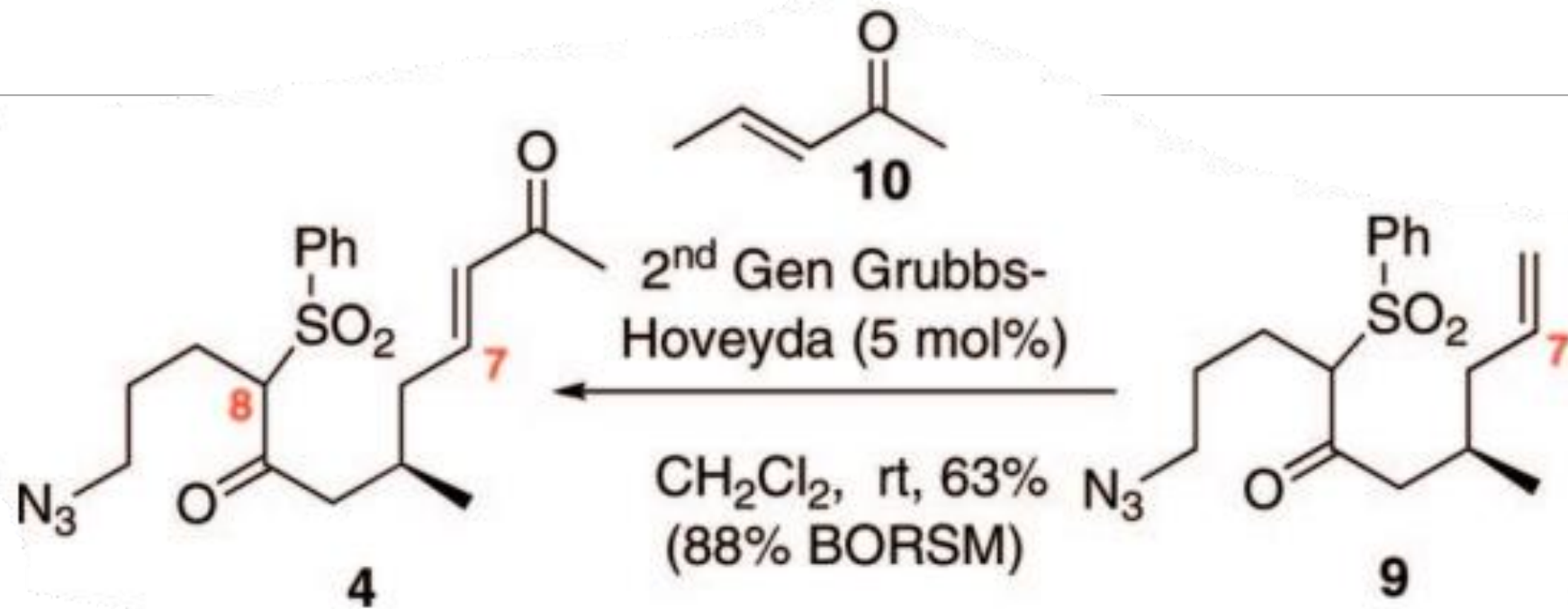


Mecanismo

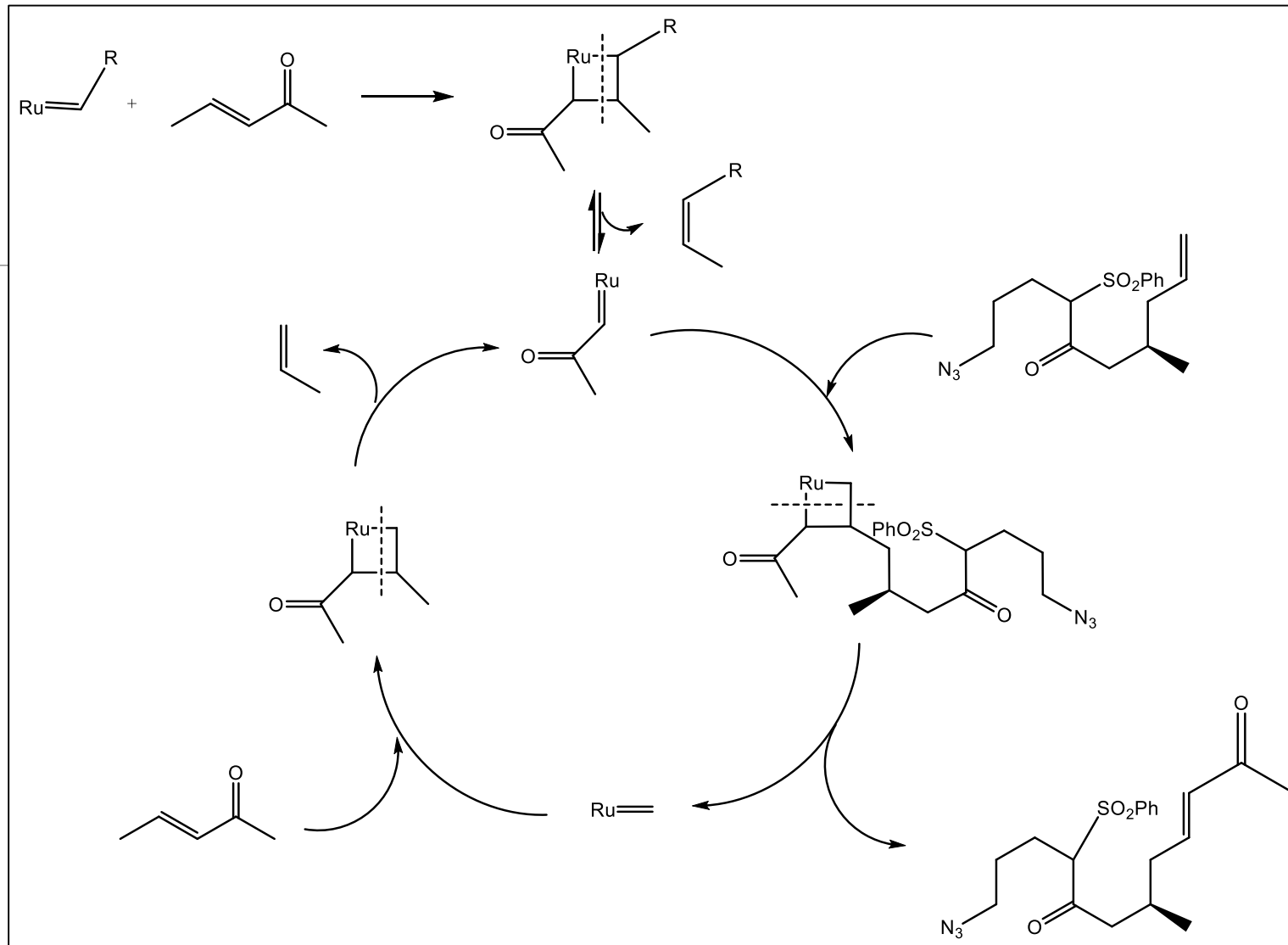




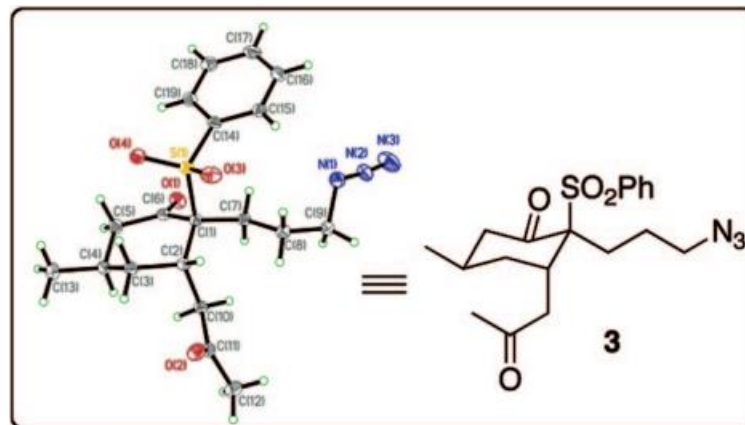
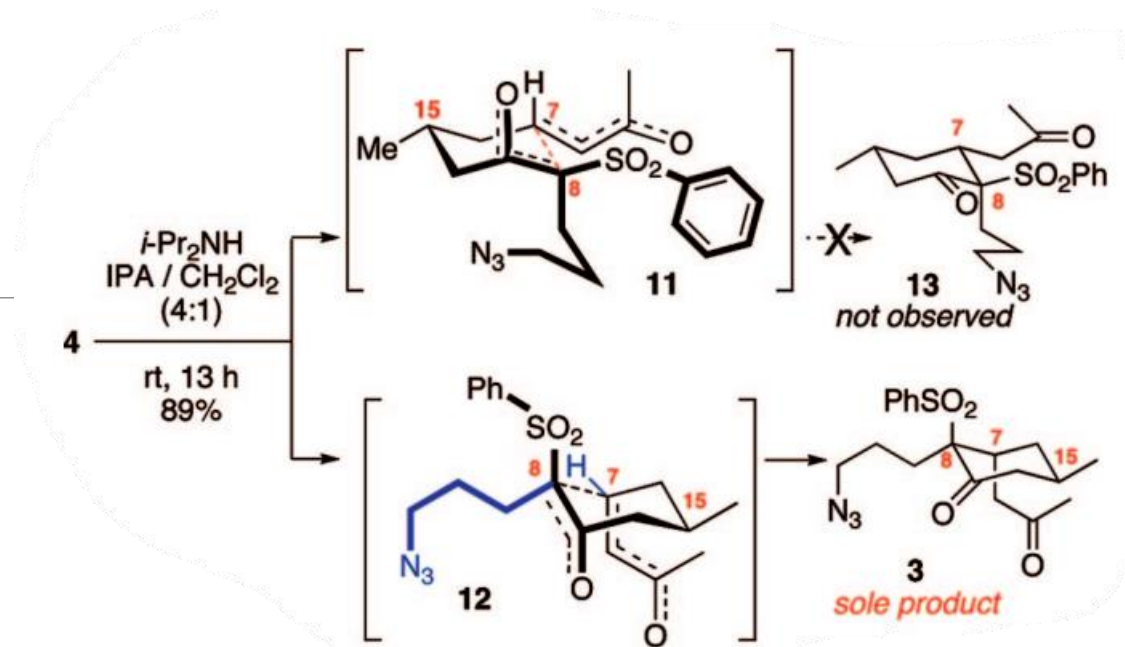


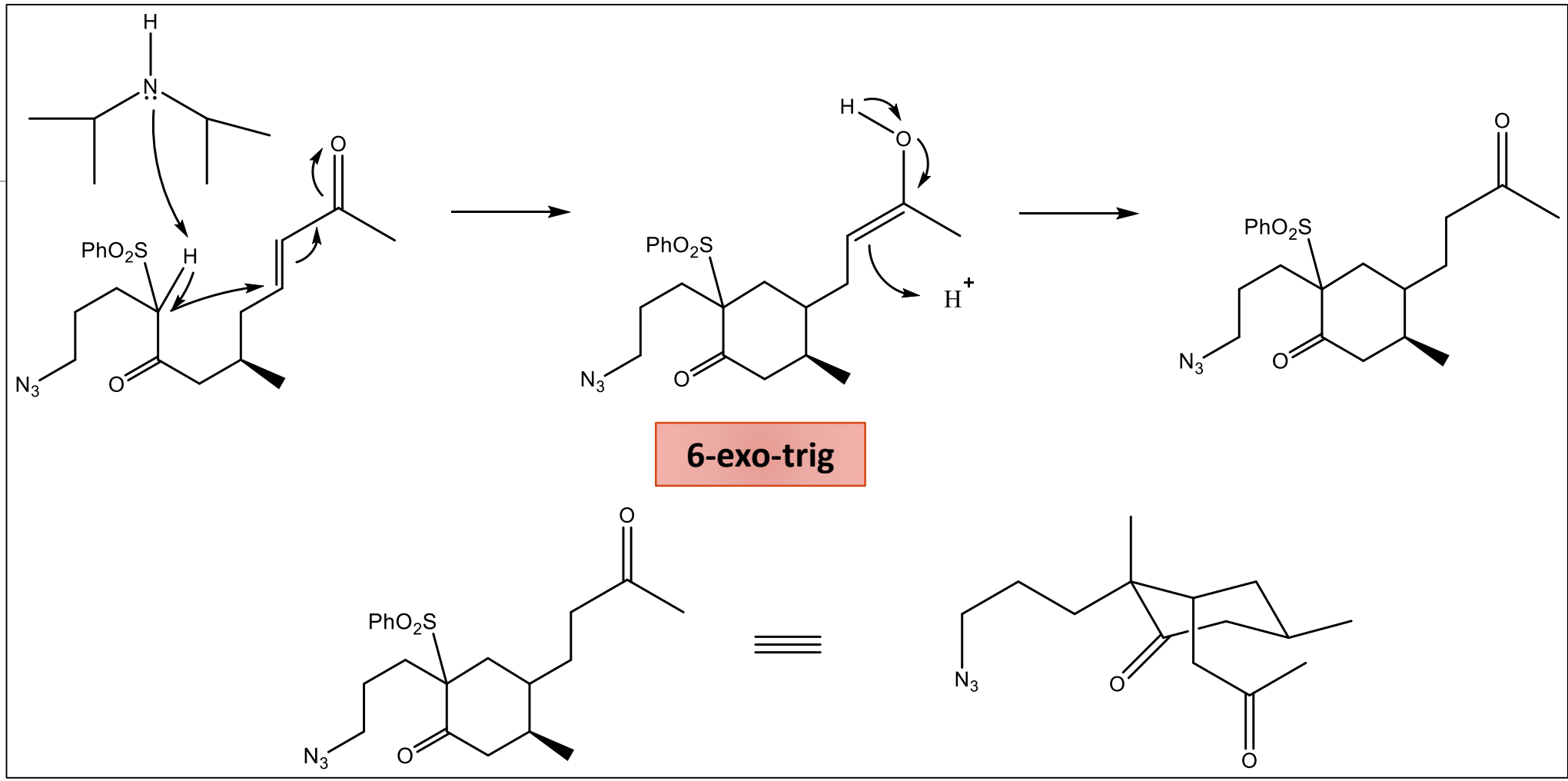


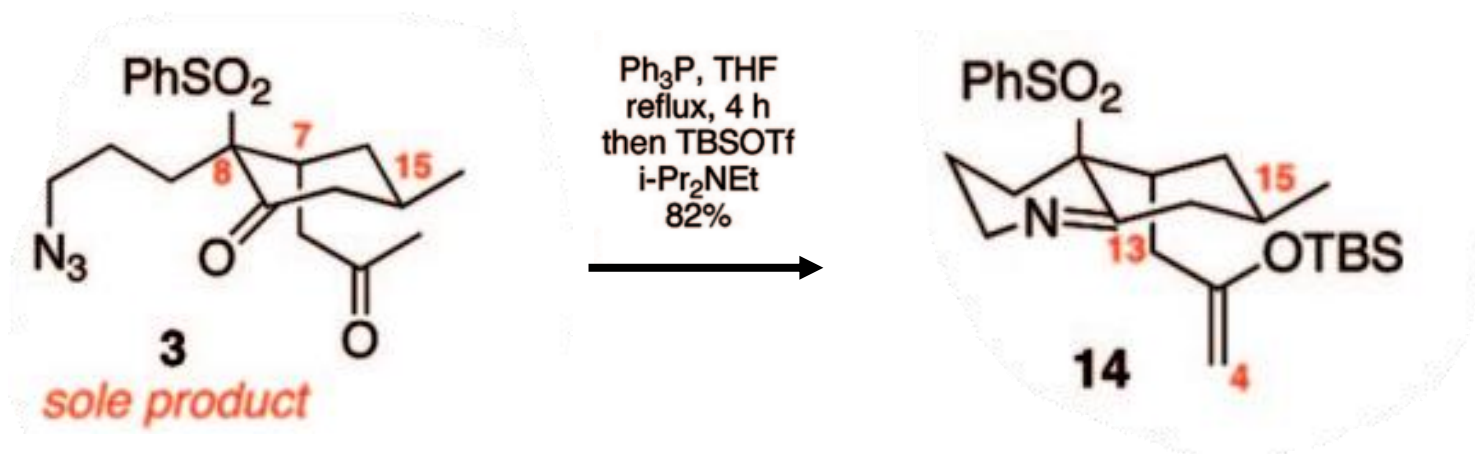
Metátesis cruzada



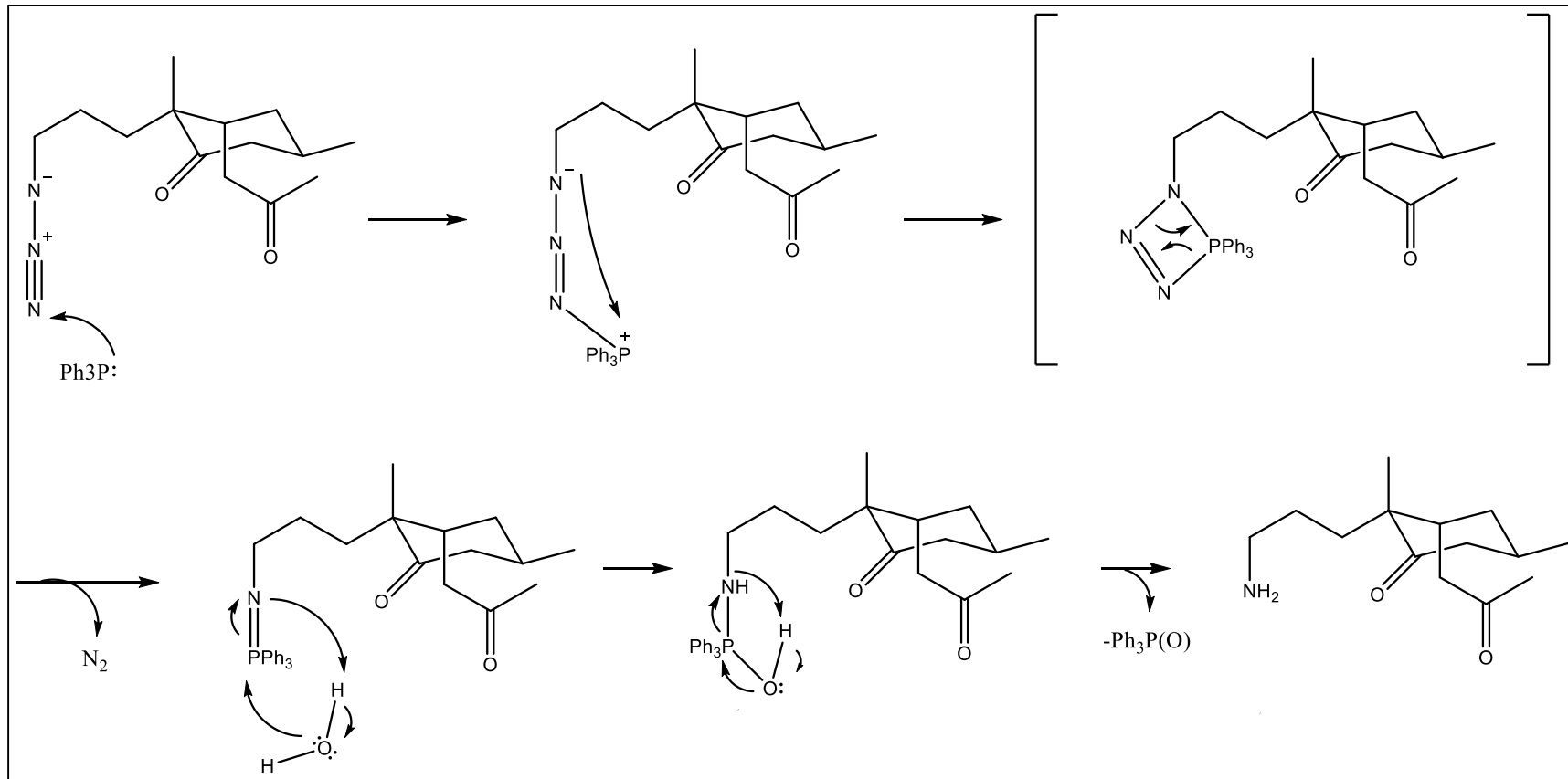
Adición de Michael
intramolecular



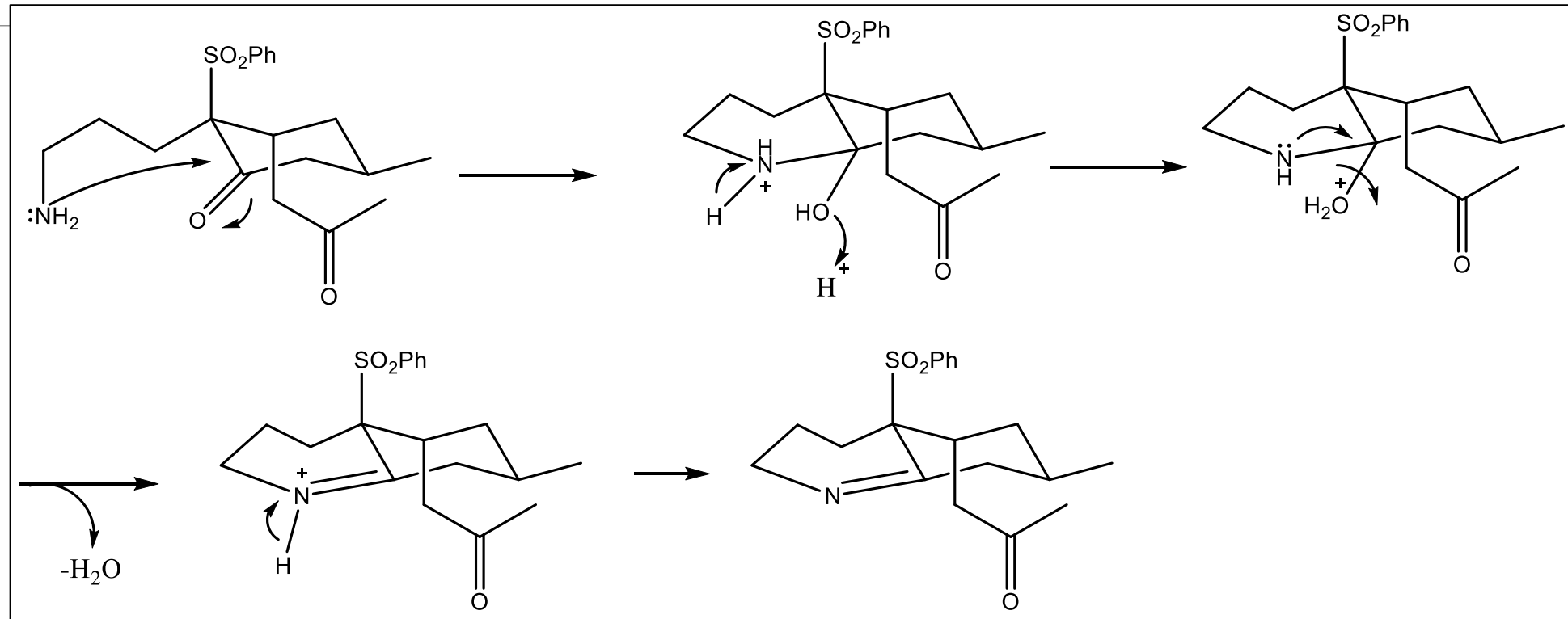


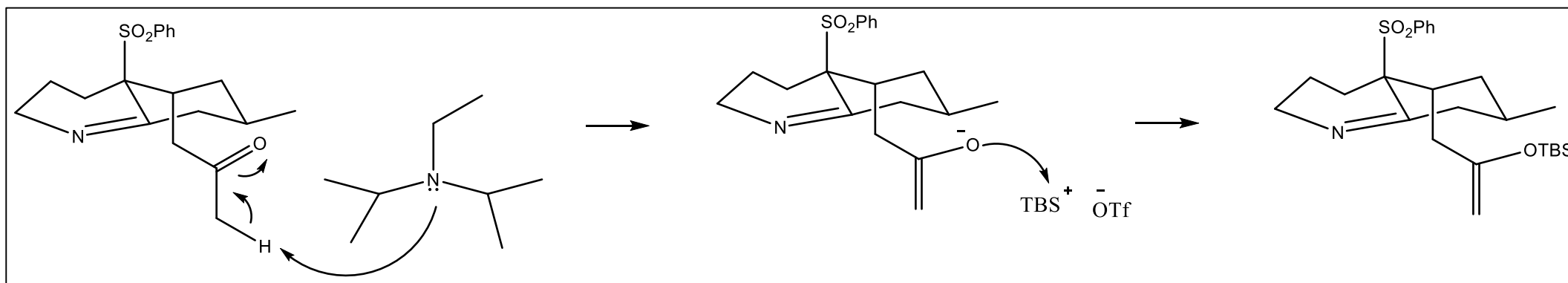


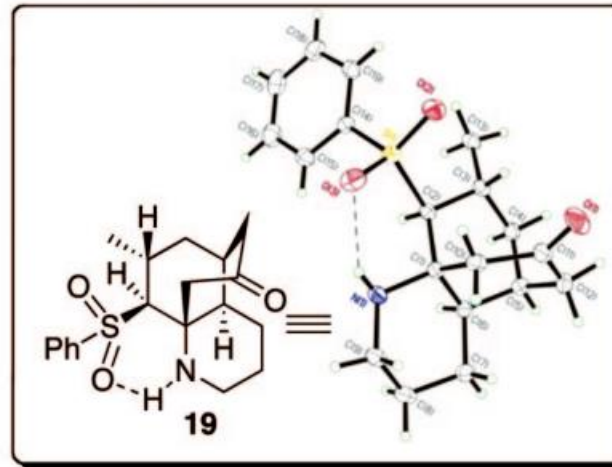
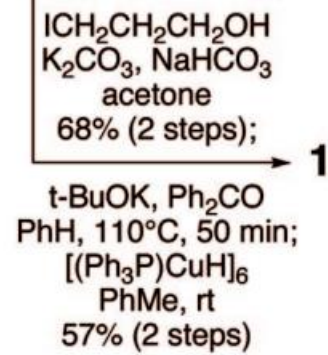
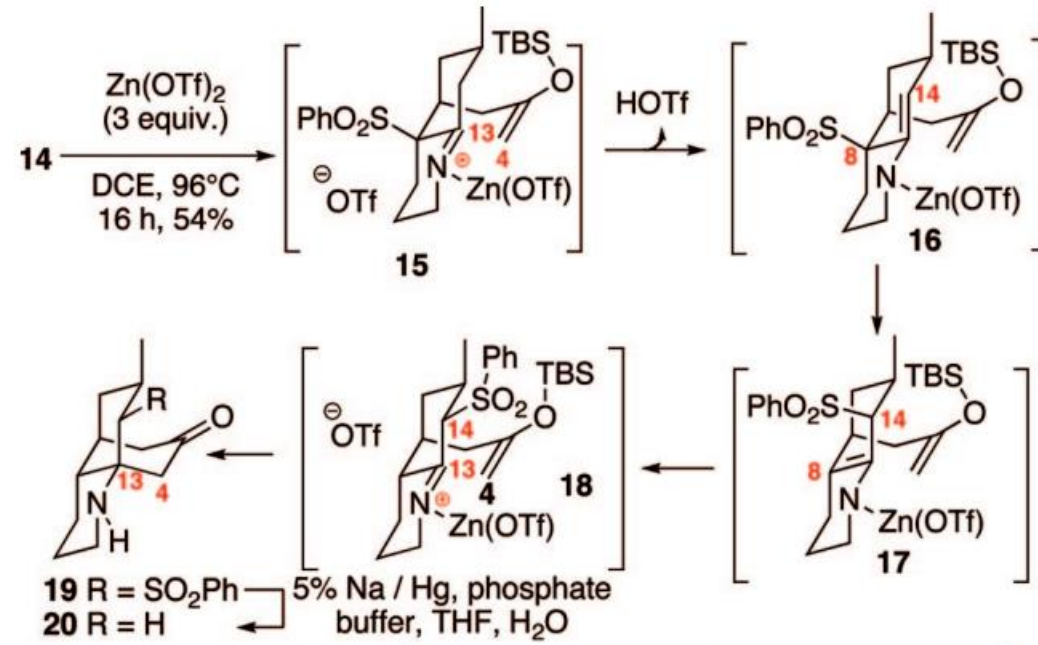
Reducción de azida de Staudinger

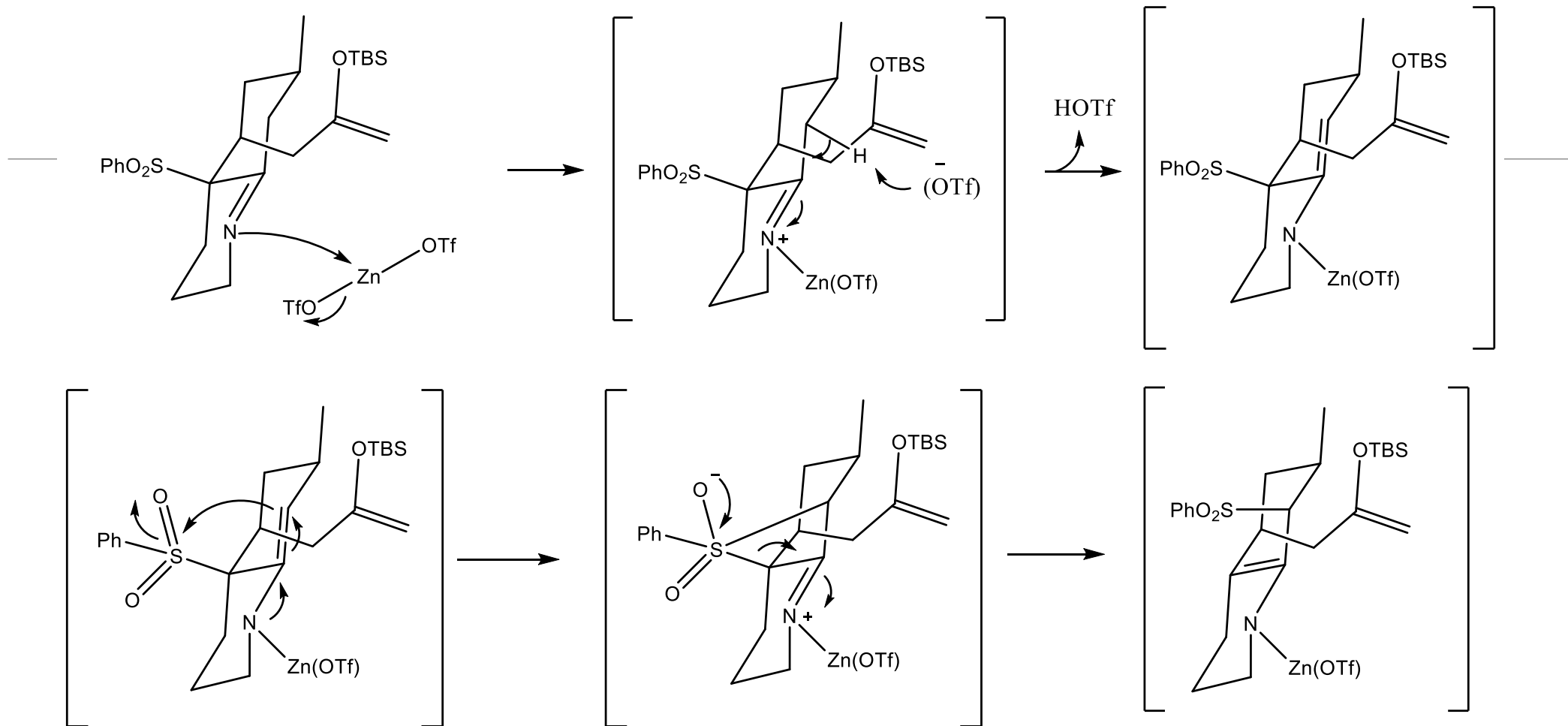


Reacción parcial de Mannich



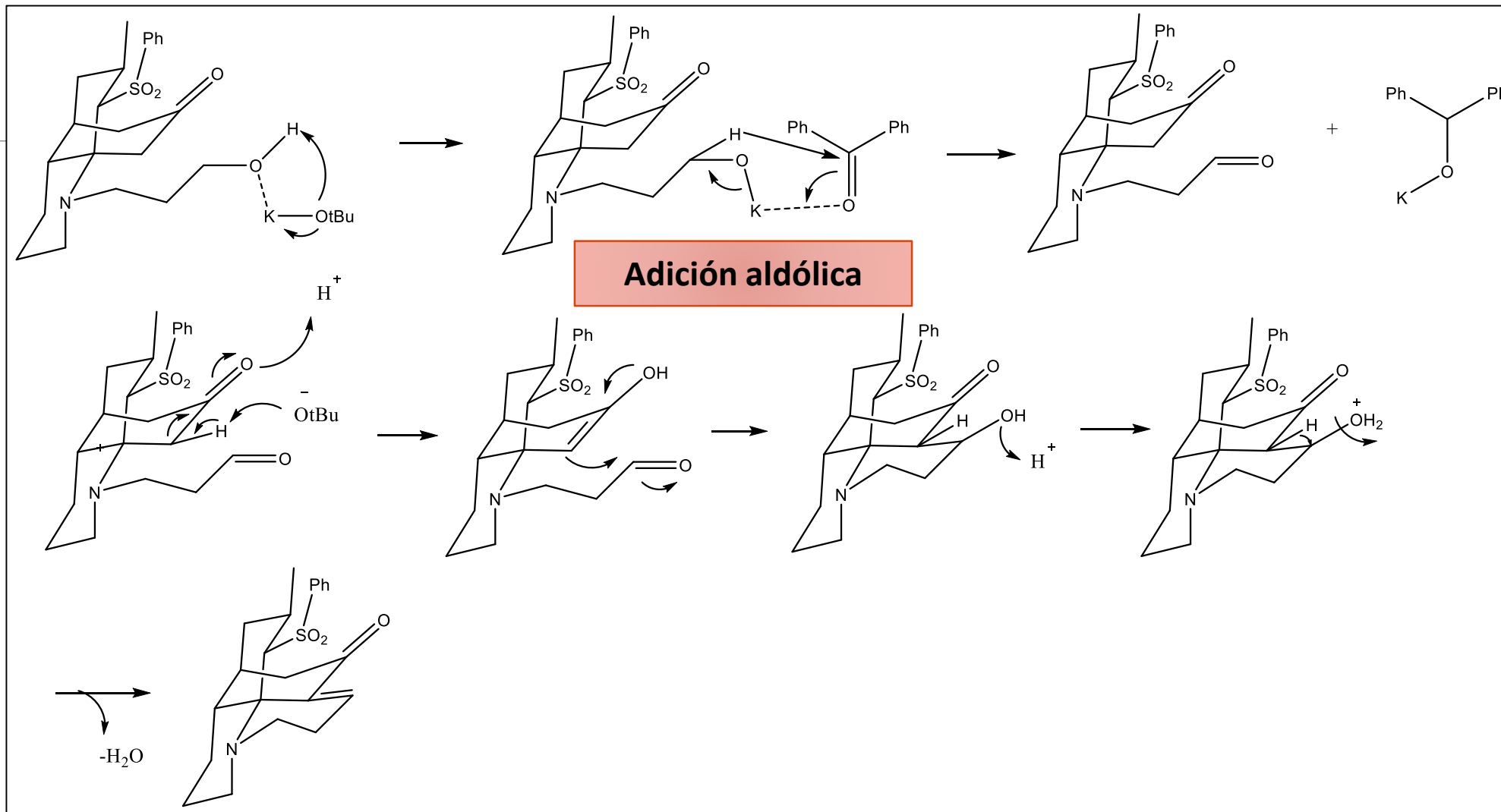




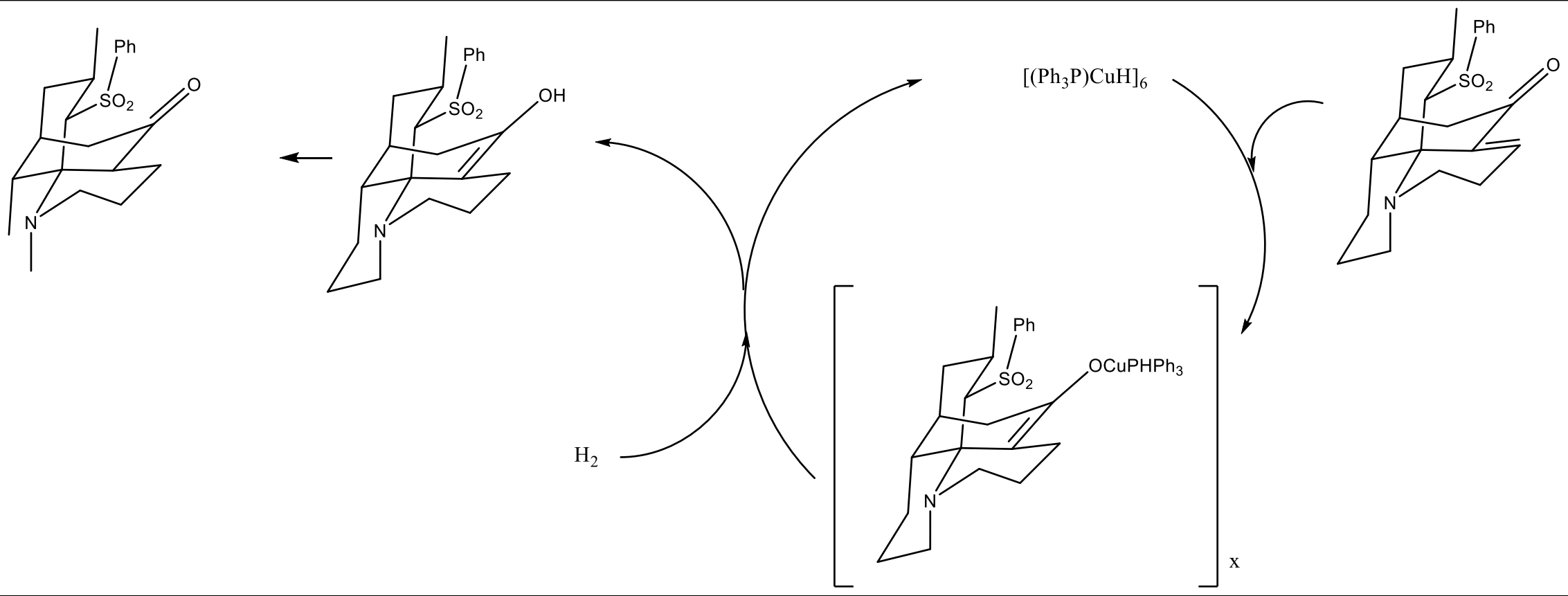


Reordenamiento 1,3 de sulfonas alílicas

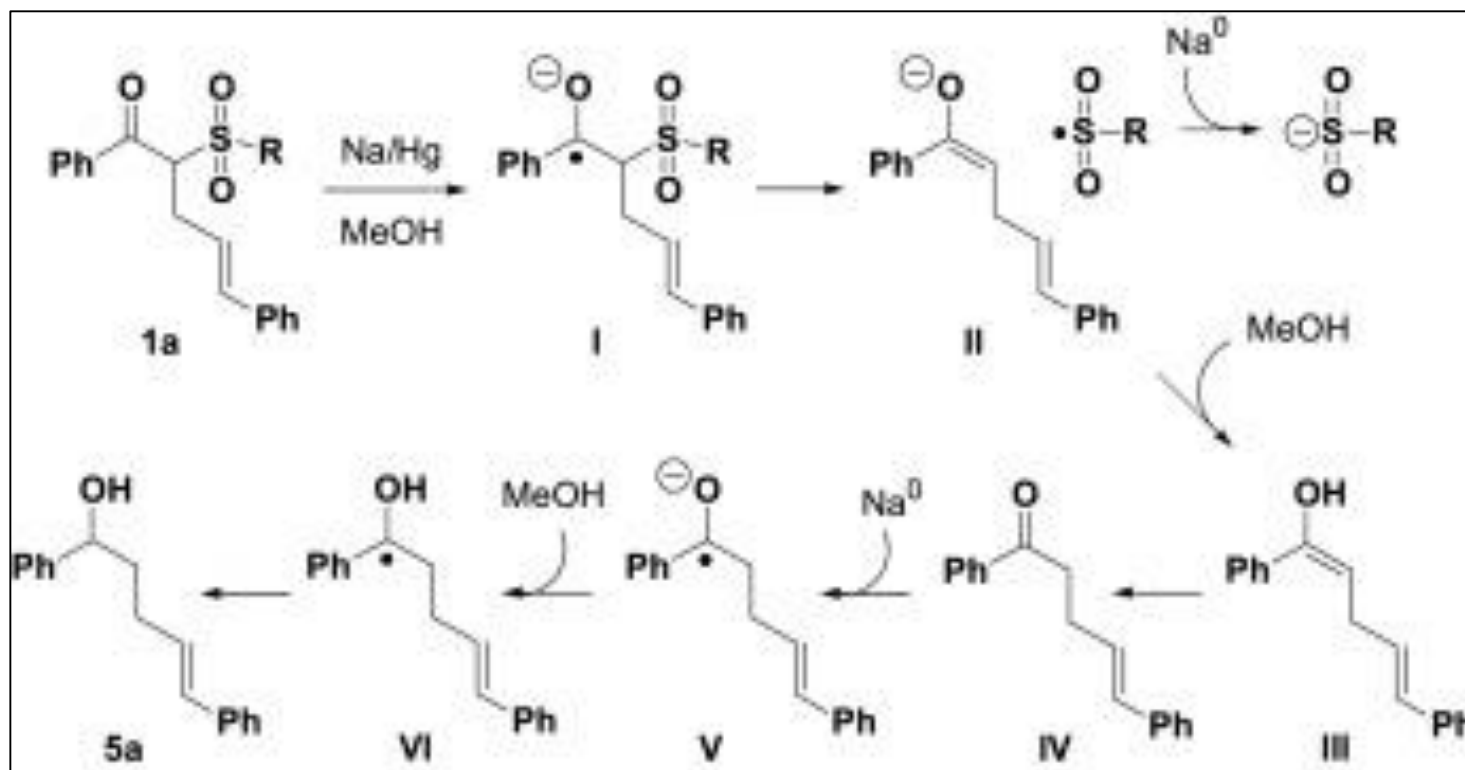
Oxidación de Oppenauer



Reduccion catalítica de Stryker



Sodium amalgam mediated desulfonylative reduction of α -functionalized β -ketosulfones



5% Na / Hg, phosphate⁻
buffer, THF, H₂O

Conclusión

- Se completó la primera síntesis total enantioselectiva de licopodina. Este enfoque abre la puerta al acceso a otros alcaloides de licopodio.

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