



QFL5931/MPT6009 – Química Verde

Fluidos Supercríticos

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Fluidos Supercríticos

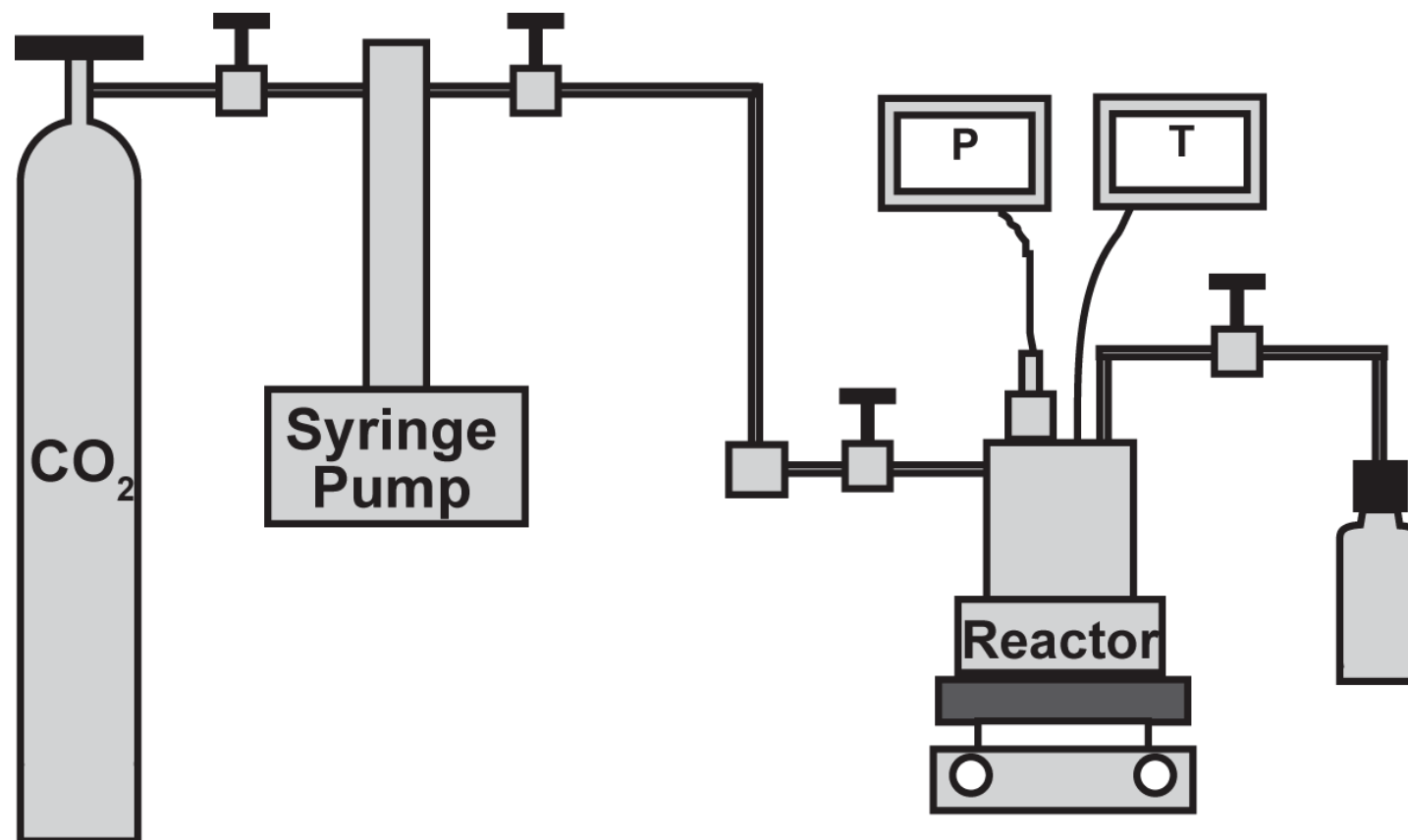
- Exemplos no GPQVA



- Aplicações do CO₂-sc
- Tensoativos/Polímeros Anfifílicos em CO₂-sc

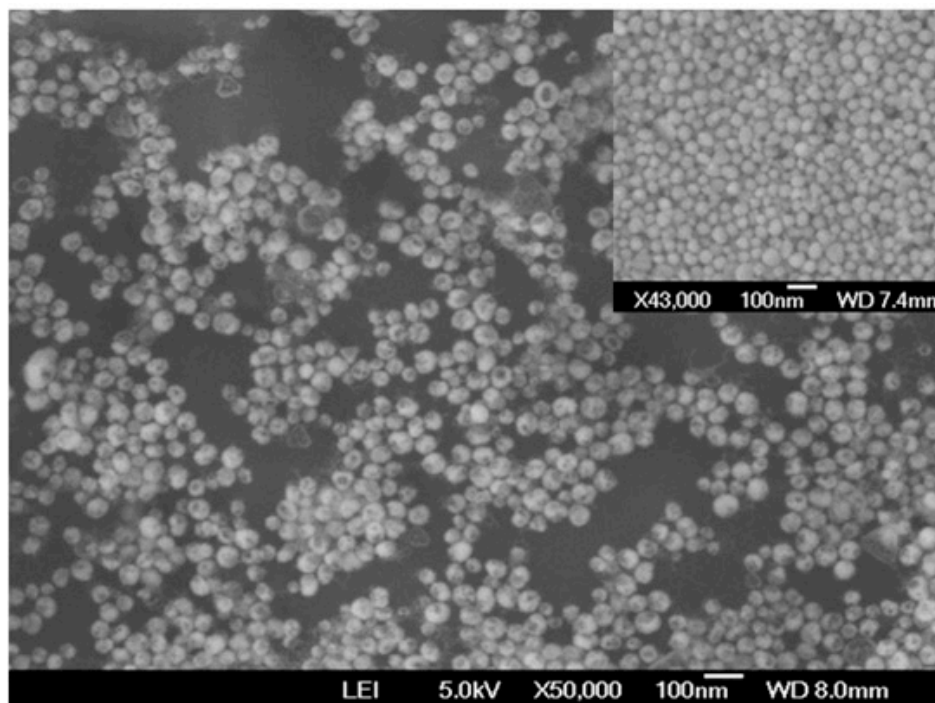
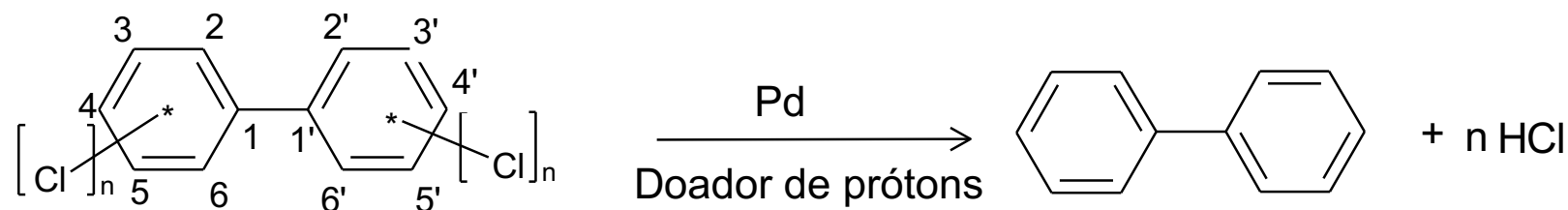


CO₂-sc como meio reacional





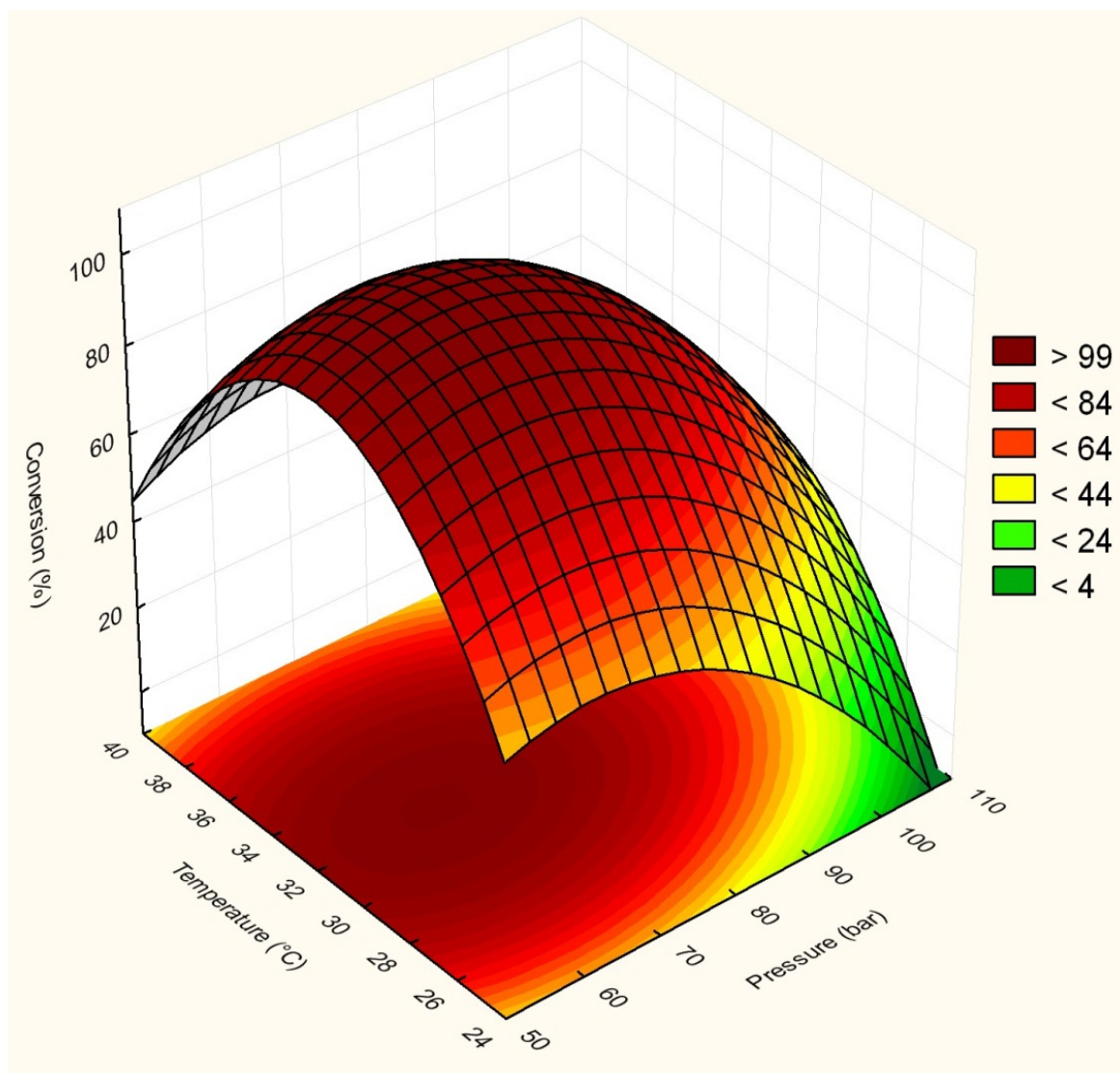
Hidrodescloração catalítica de PCBs



Nanoesferas ocas de Pd

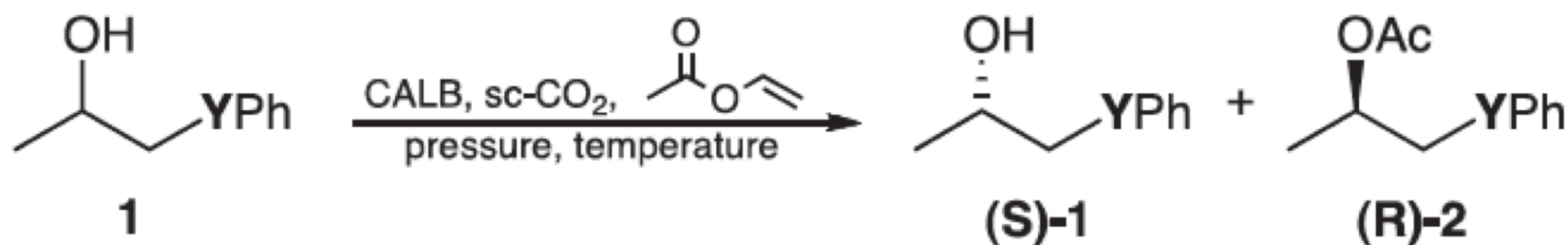


Otimização das condições reacionais





Resolução Cinética Quiral

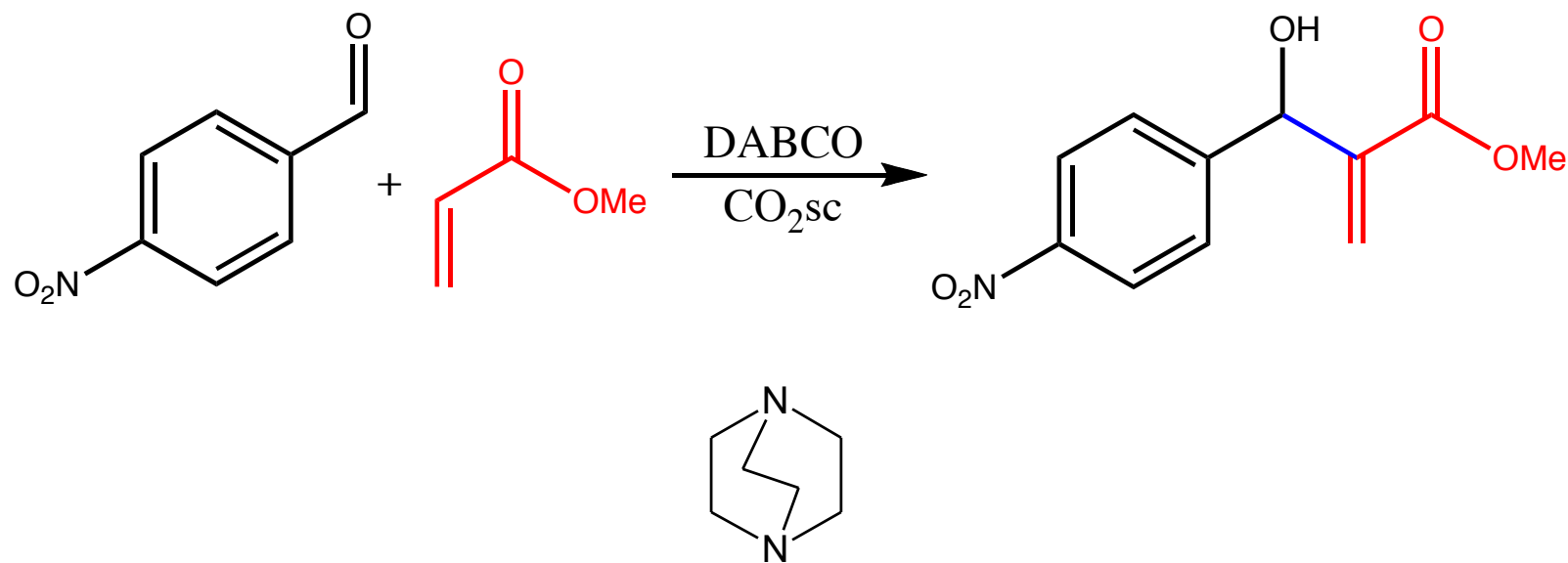


Y = S (1a), Se (1b) and Te (1c)

Y = S (2a), Se (2b) and Te (2c)



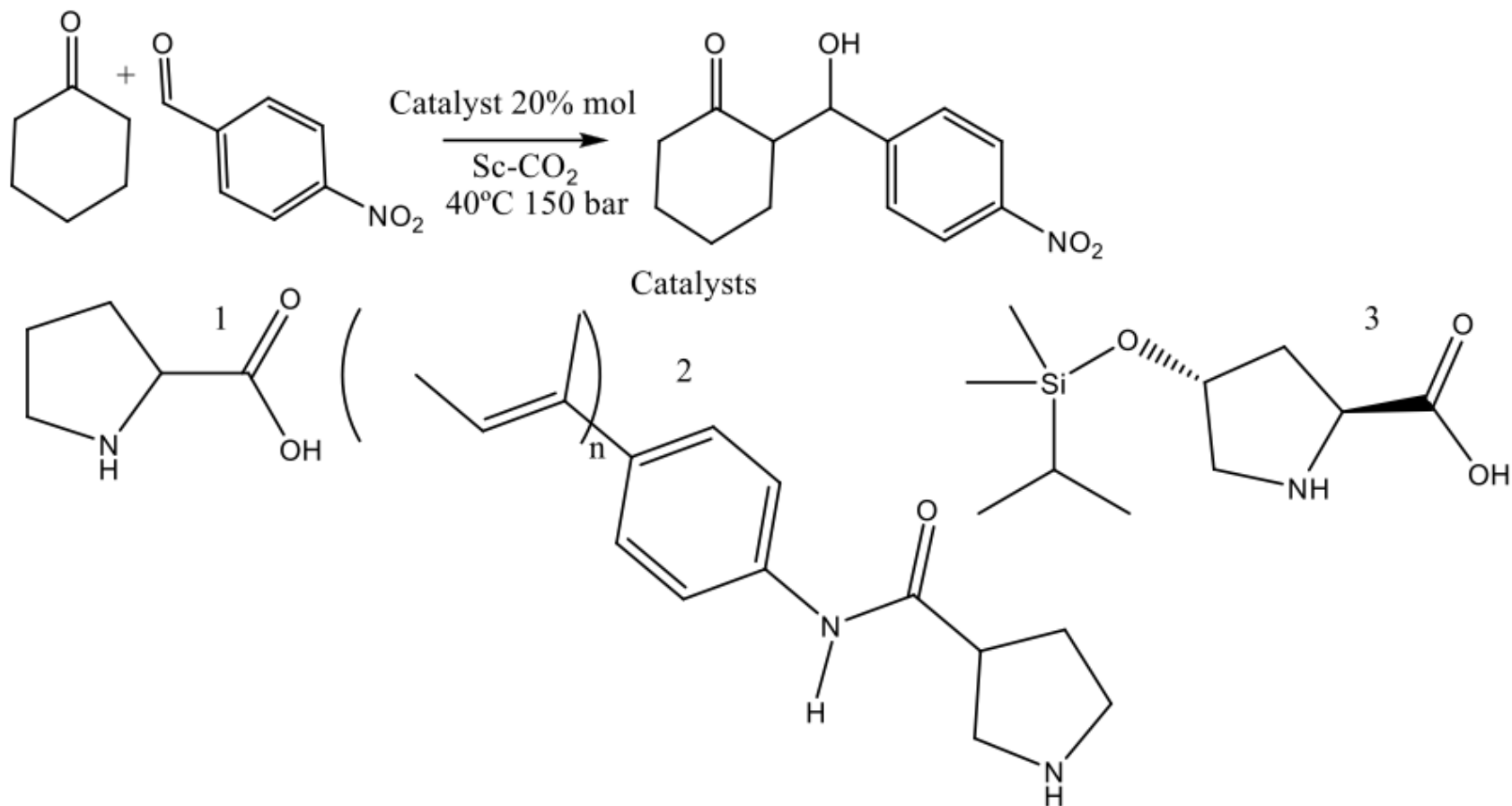
Reação de Morita-Bayllis-Hillman (MBH)





CO₂-sc como meio reacional

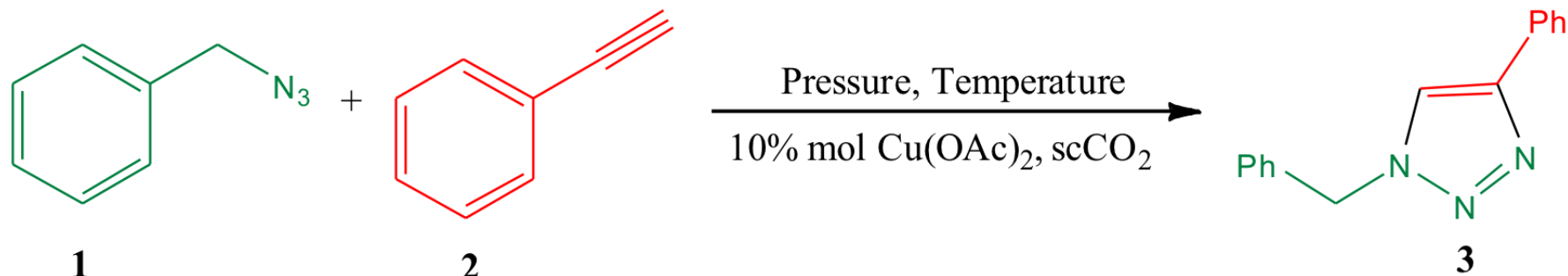
Organocatálise na Condensação Aldólica



Green Process Synth 2013



Reações do tipo “Click Chemistry”





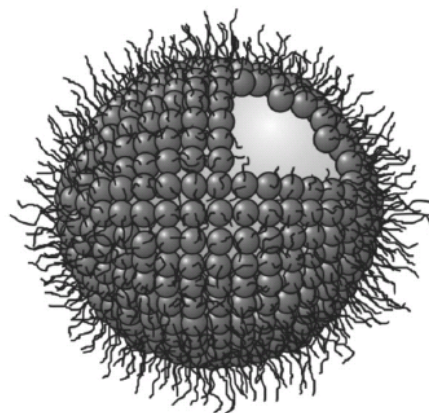
Tensoativos e Polímeros Anfifílicos para $\text{CO}_2\text{-sc}$



Tensoativos para CO₂-sc



Micela “Reversa”



Eastoe, J. et al. *PCCP* 2005, **7**, 1352

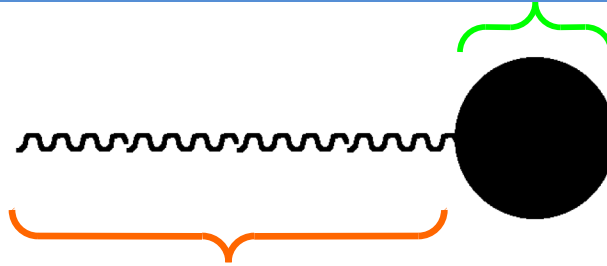
**Núcleo
CO₂-fóbico**

Lipofílico

Hidrofílico

Tensoativos de Carboidratos

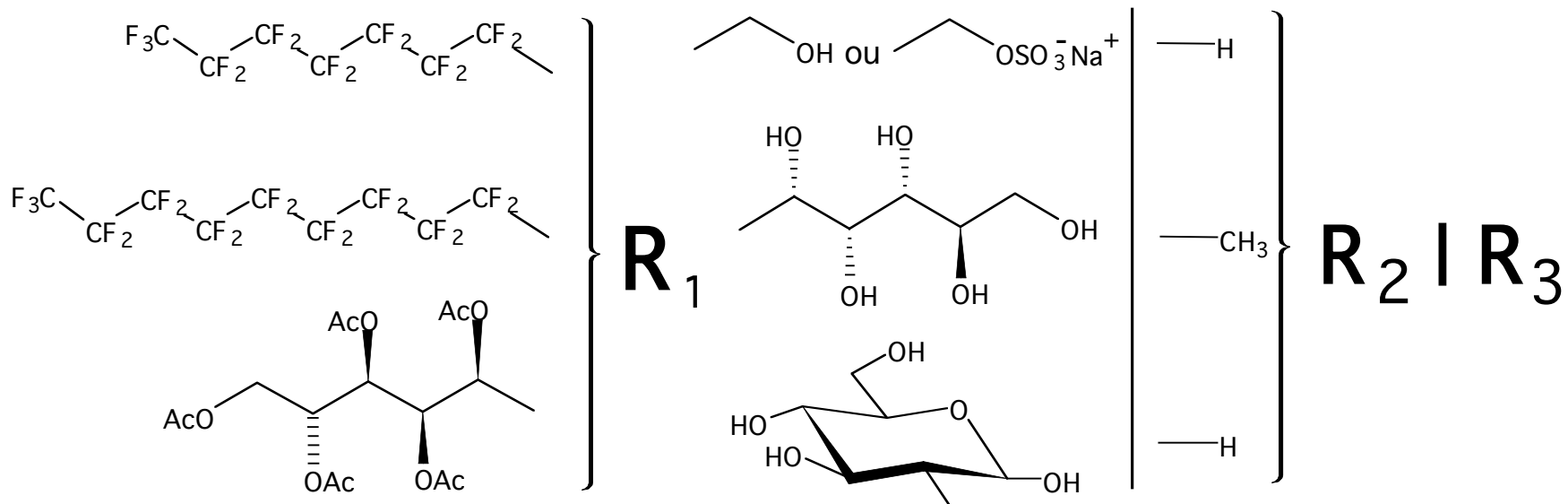
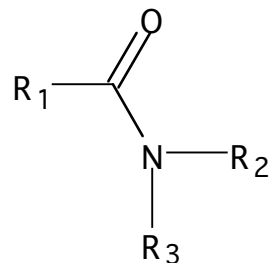
Carboidrato



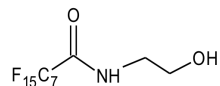
Carboidrato Peracetilado

Tensoativos Verdes!

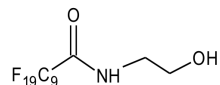
Tensoativos Sintetizados



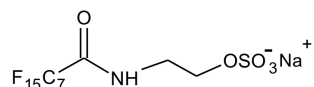
Tensoativos Perfluorados



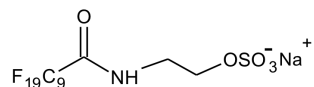
F1A



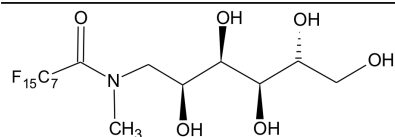
F1B



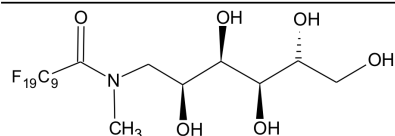
F1A-OSO₃Na



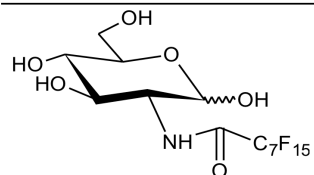
F1B-OSO₃Na



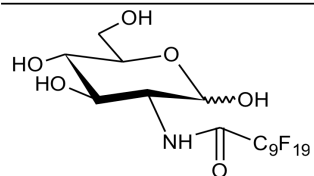
F2A



F2B

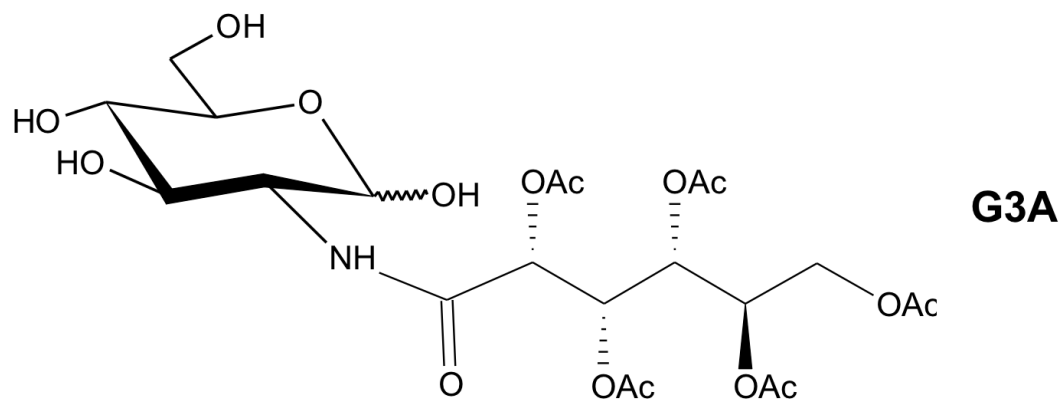
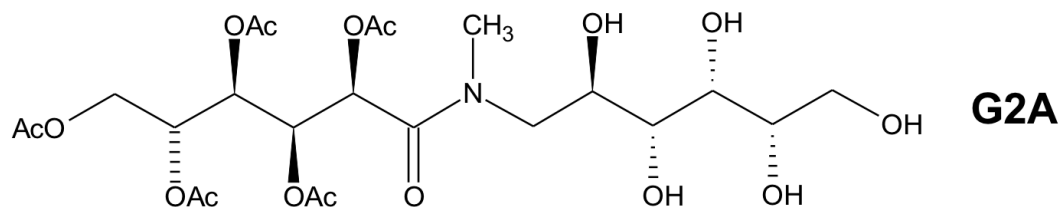
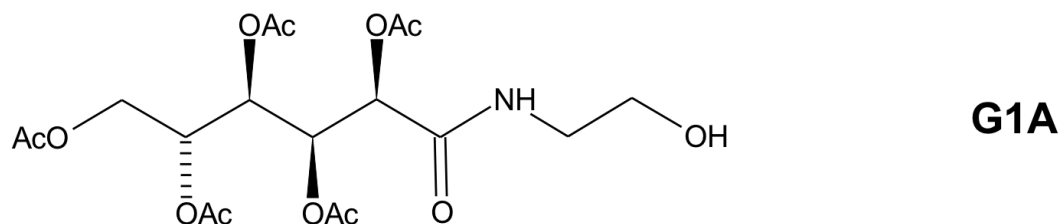


F3A

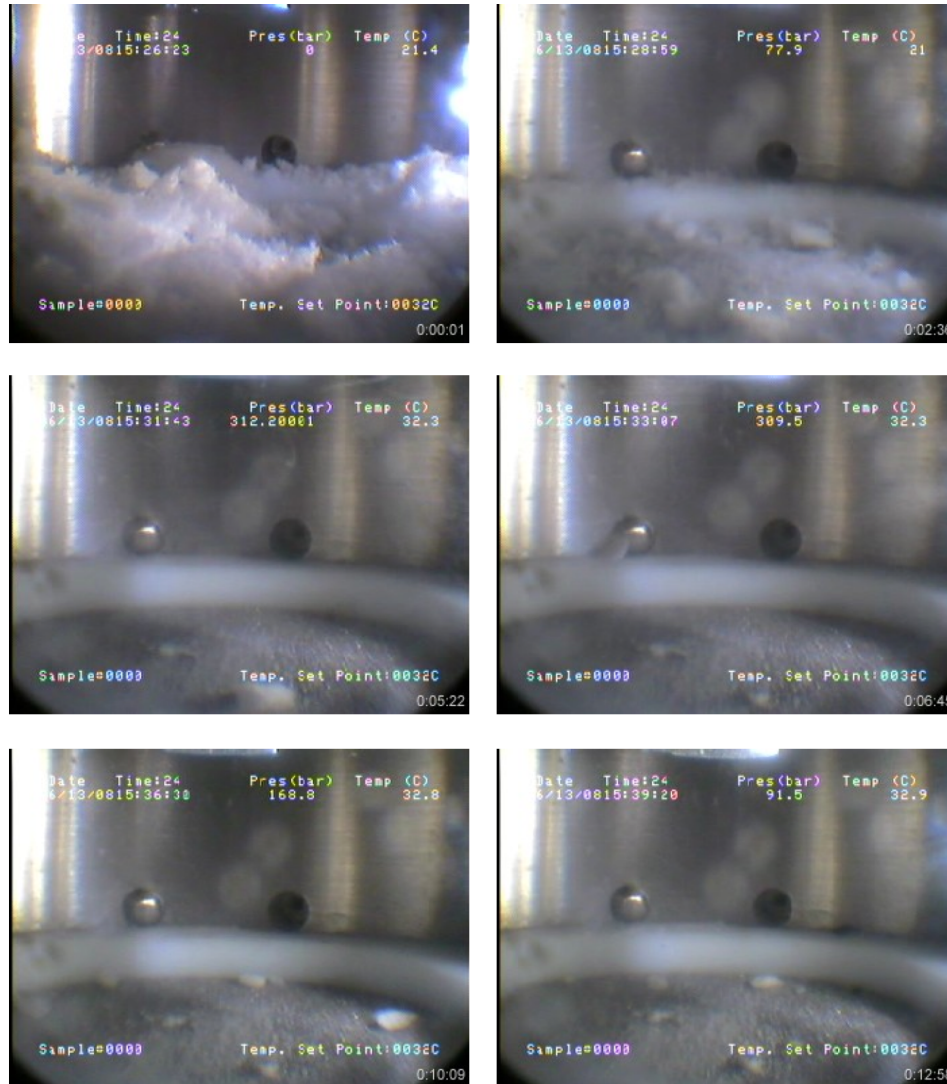


F3B

Tensoativos Peracetilados



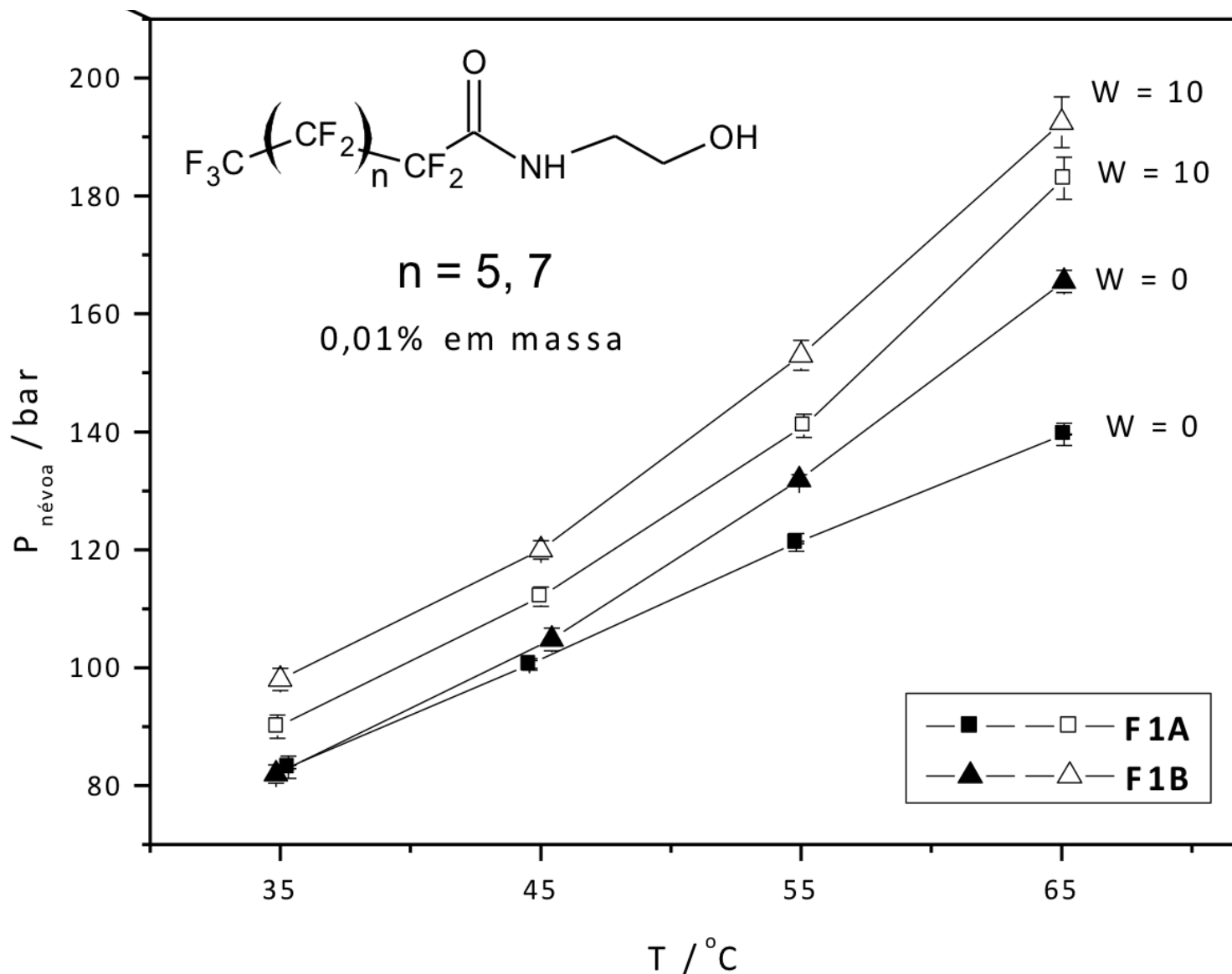
Solubilização dos Tensoativos em CO₂-SC



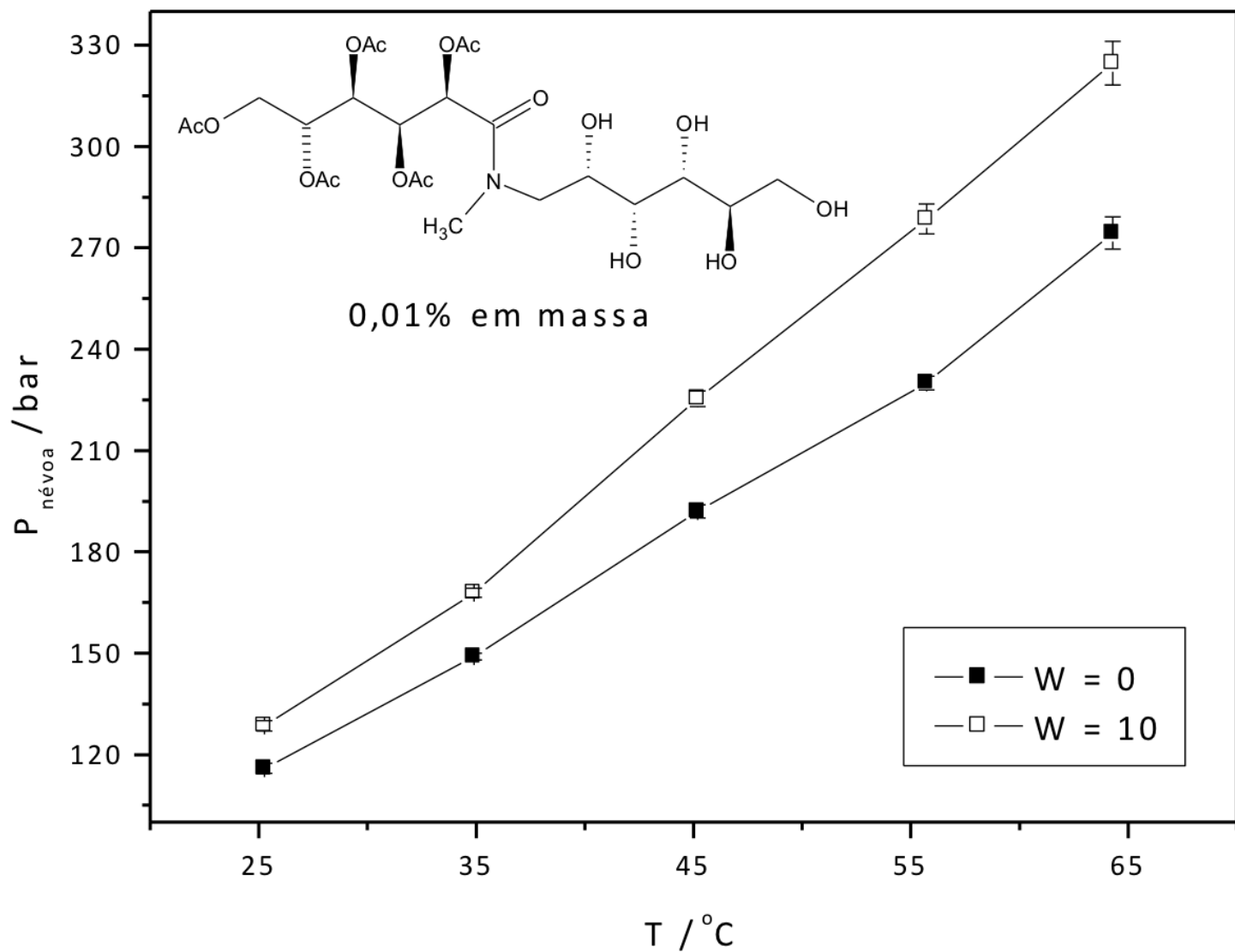
Pressão de Névoa dos Tensoativos em CO_2 -sc



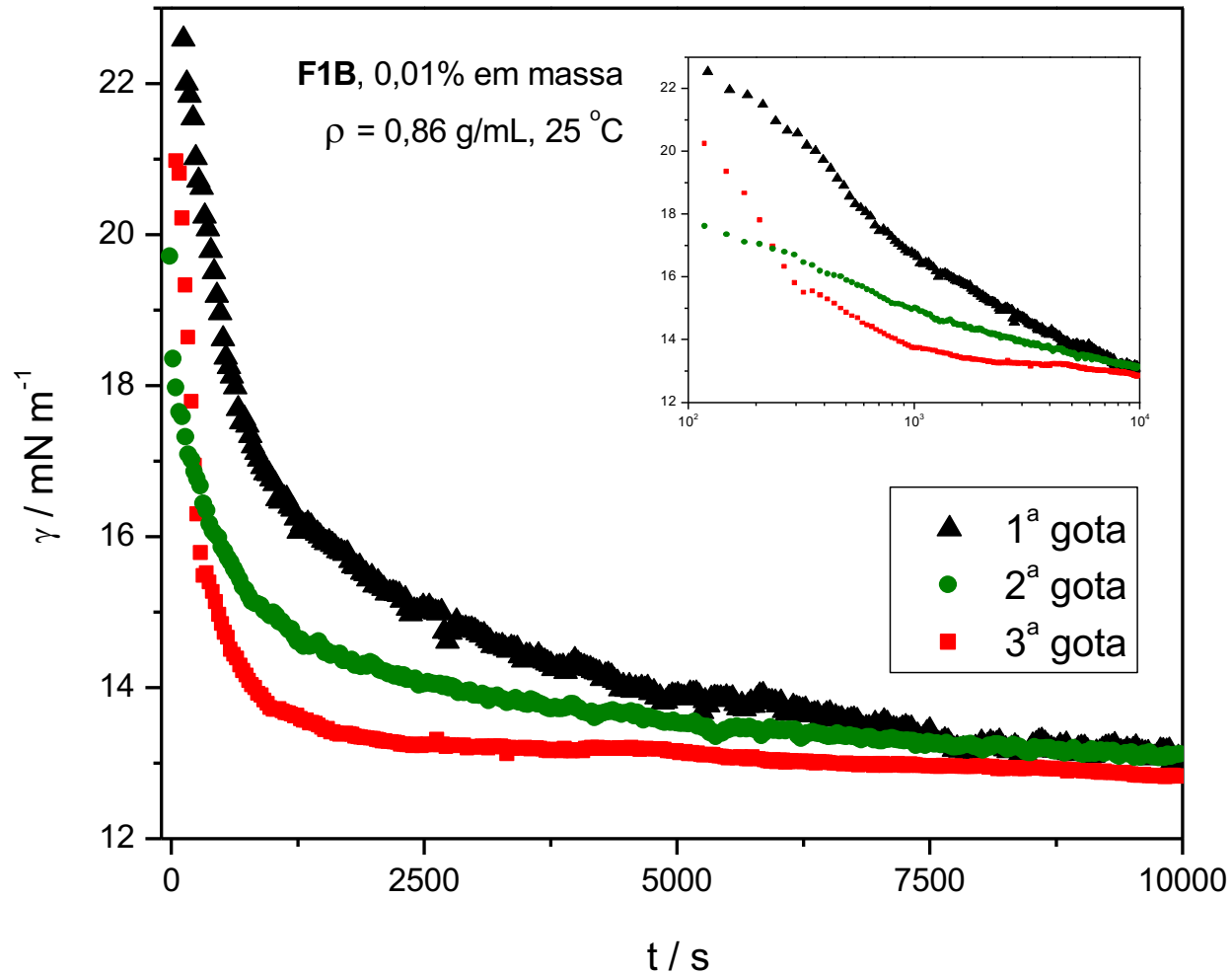
Pressão de Névoa dos Tensoativos em $\text{CO}_2\text{-sc}$



Pressão de Névoa dos Tensoativos em $\text{CO}_2\text{-sc}$



Tensão Interfacial Dinâmica





Polímeros Anfifílicos para CO₂-sc



Polímeros Dendríticos

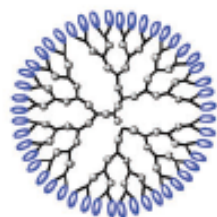
Polímero Linear



Polímeros Dendríticos

Monodispersos

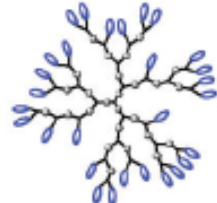
Polidispersos



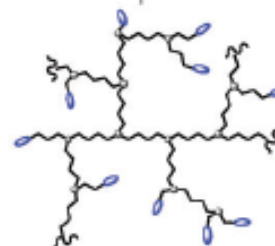
Dendrimeros



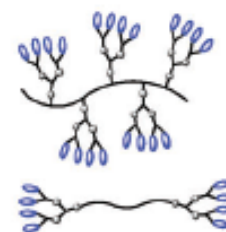
Dendrons



Hiperramificados

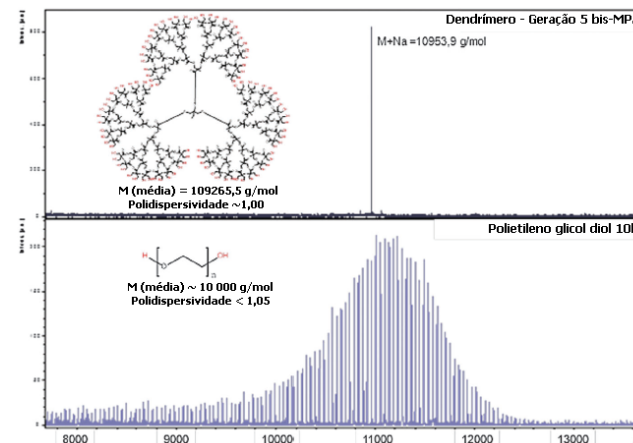


Dendrigrafos



Híbridos
Linear - Dendrítico

Dendron = Árvore



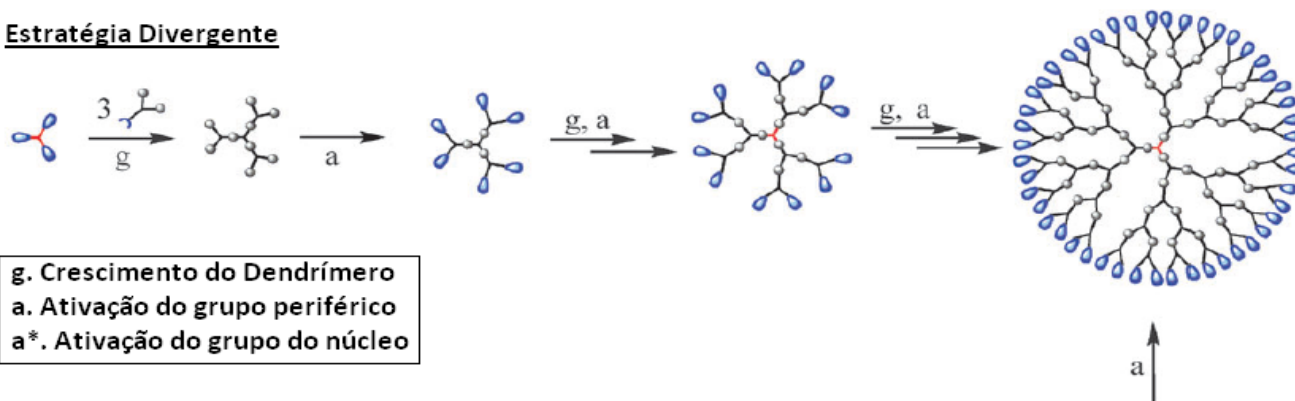
Malkoch, M. *et al.*; Simplifying the synthesis of dendrimers: accelerated approaches, *Chemical Society Reviews*, **2012**, 41, 13, 4585-4772



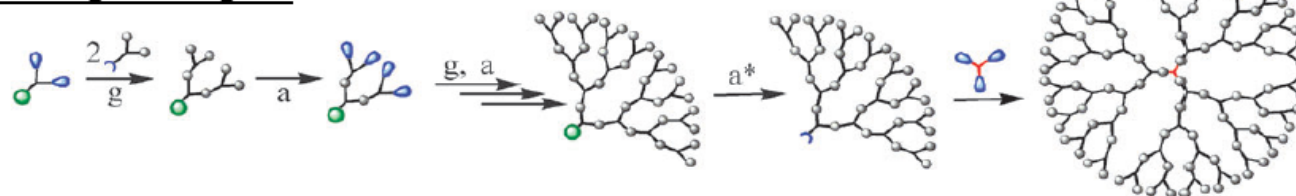
Polímeros Dendríticos

Estratégias de Síntese

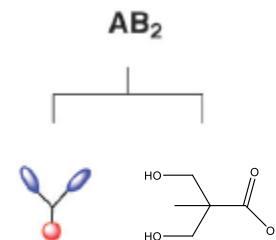
Estratégia Divergente



Estratégia Convergente



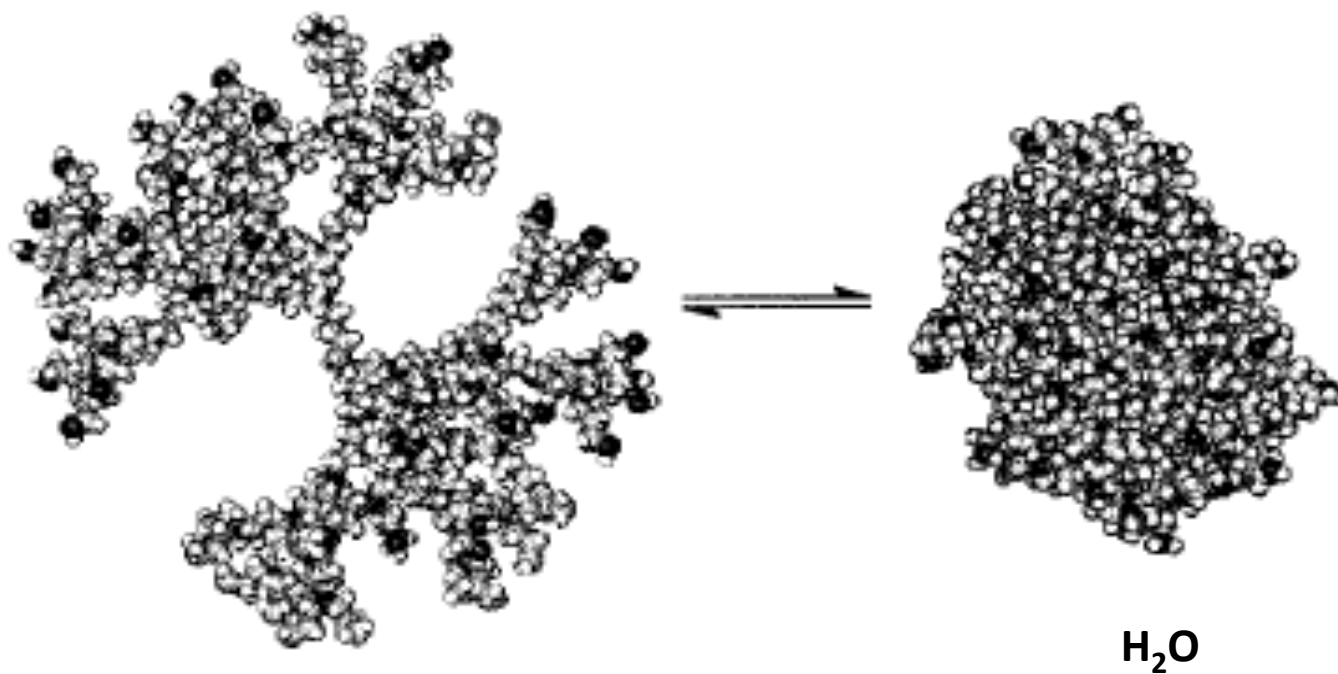
Monômero Bi-Funcional
Funcionalidades: A e B



Malkoch, M. *et al.*; Dendritic architectures based on bis-MPA: functional polymeric scaffolds for application-driven research, *Chemical Society Reviews*, **2013**, 42, 13, 5858-5879



Dendrímeros Anfifílicos em CO₂-sc

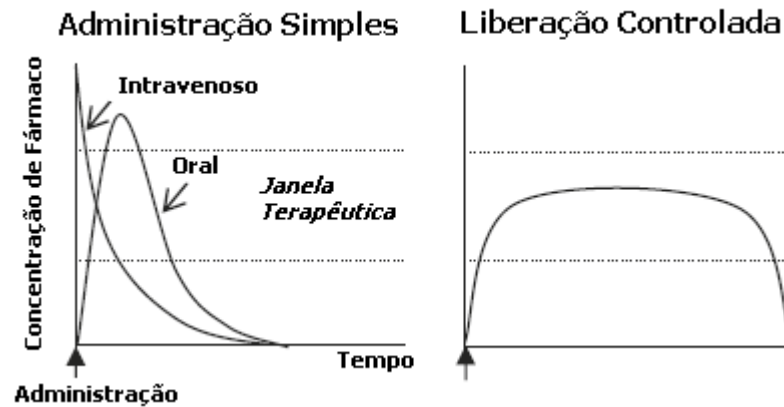


$\text{CO}_2\text{-sc}$

H_2O

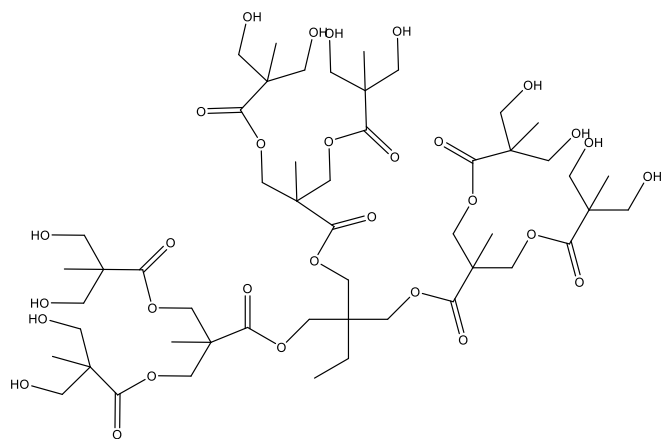
Drug Delivery : Liberação Controlada de Fármacos

- Aumento de Eficácia
- Diminuição de dose
- Controle de Solubilidade
- Redução de Toxicidade
- Uso de marcadores
- Prolongamento da vida de fármacos sensíveis (*e.g.* luz, enzimas)
- Direcionamento para a região de interesse

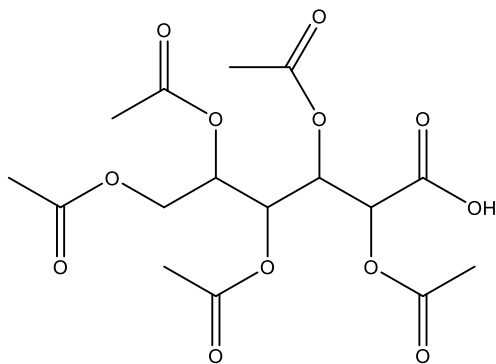




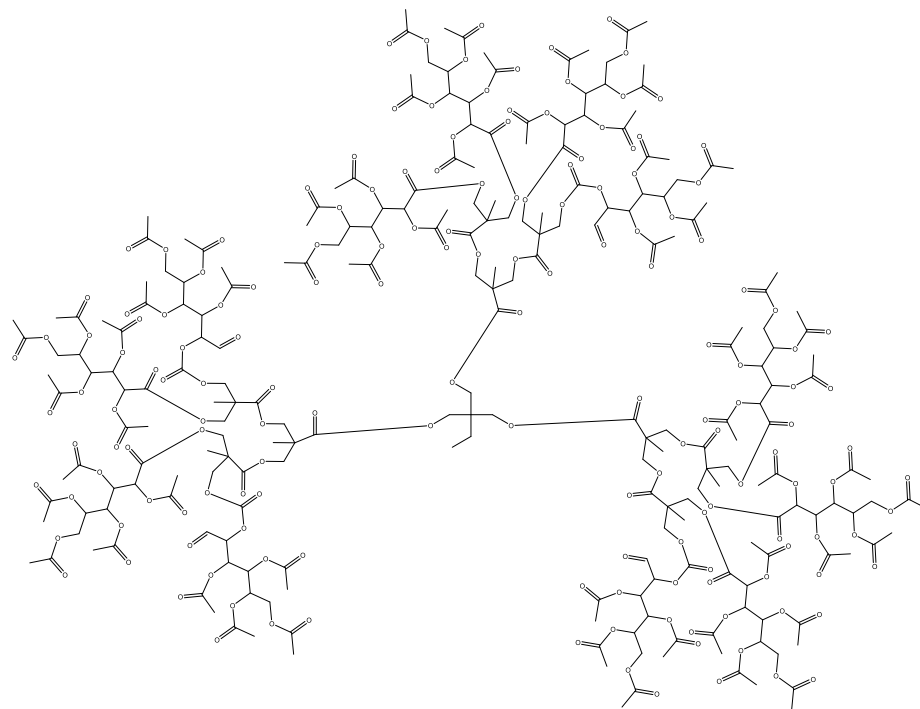
Poliésteres Dendriméricos



TMP-[G#2]-(OH)₁₂



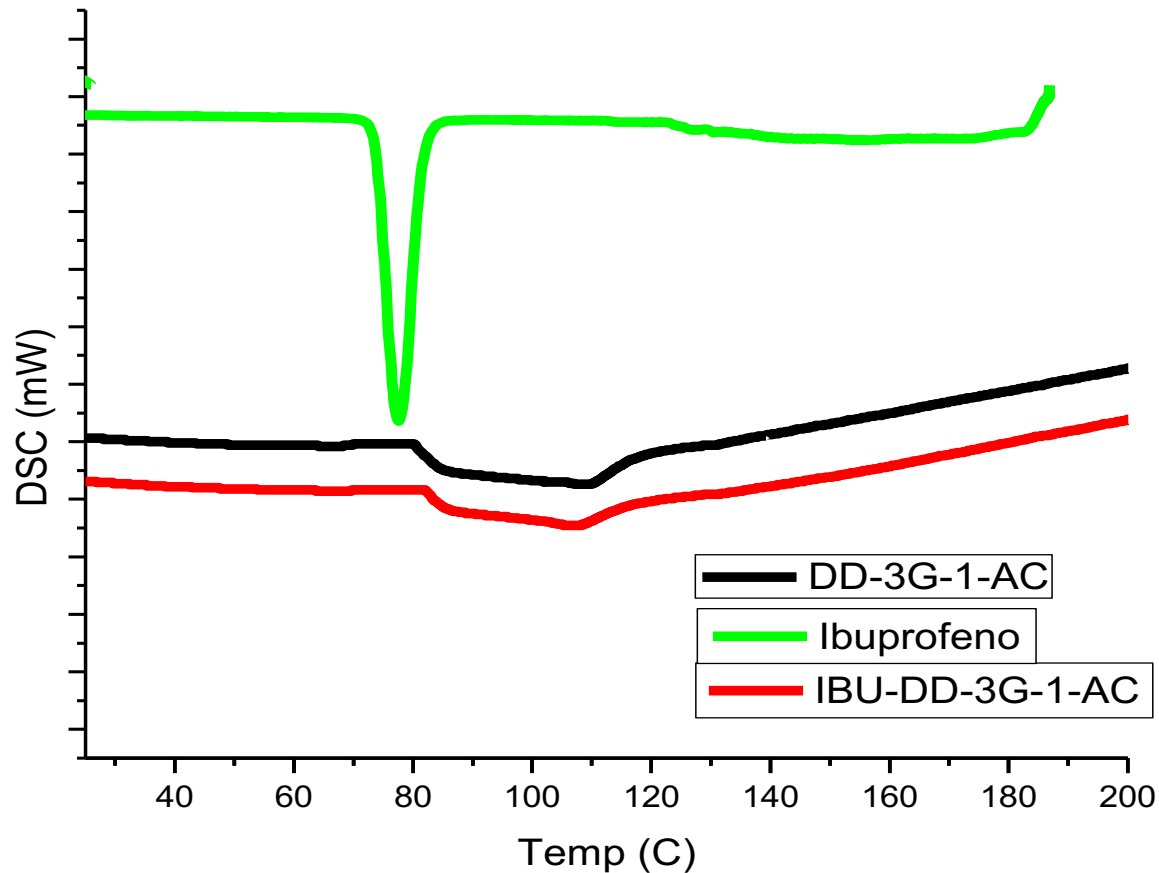
Ácido Glucônico
Peracetilado



TMP-[G#2]- Peracetilado

Encapsulamento de Ibuprofeno nos Polímeros Hiperramificados - DSC

DSC - Encapsulamento DD-3G-1-AC



Estudos de Liberação

