

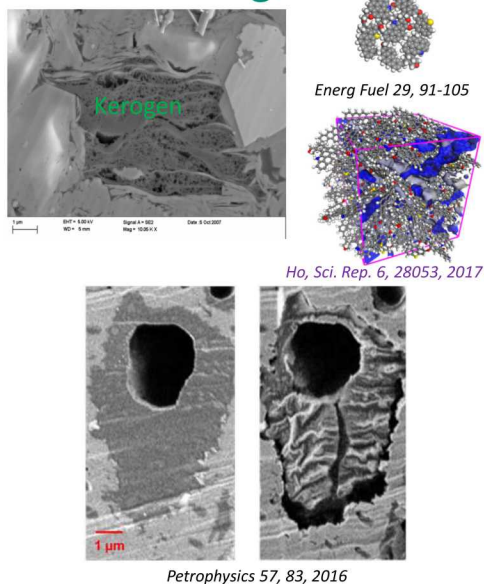


Molecular Insight into the Swelling of Geological Materials

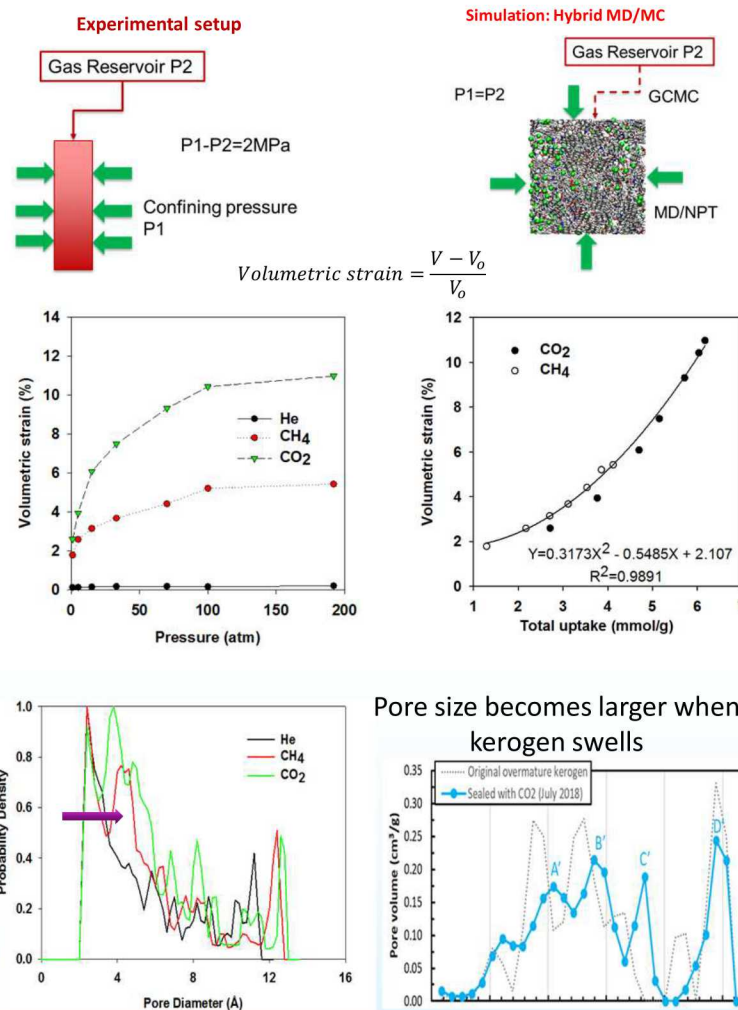
Tuan A. Ho*, Yifeng Wang, Jeffery A. Greathouse, Guangping Xu, and Louise J. Criscenti

Objective: Studying the effect of molecular interaction on the swelling of kerogen and montmorillonite

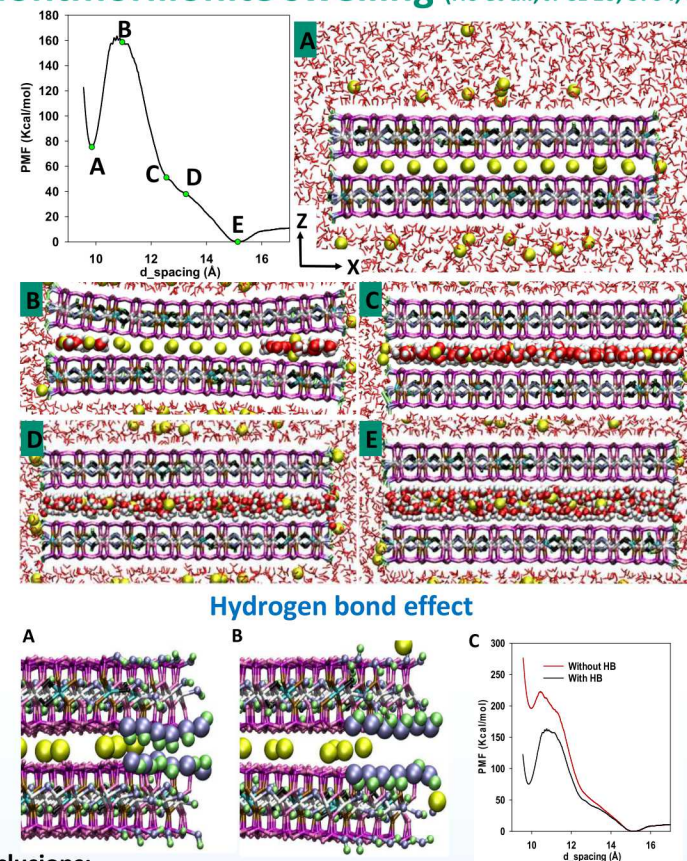
Shale - Kerogen



Kerogen swelling (Ho et al., PCCP 20, 11390, 2018)



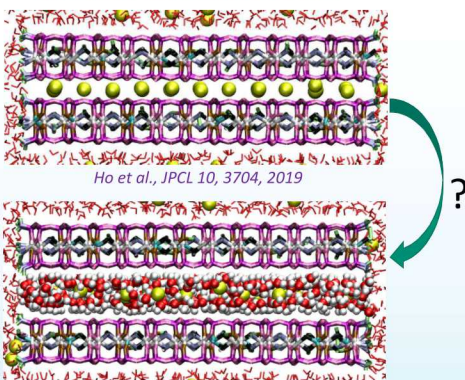
Montmorillonite swelling (Ho et al., JPCL 10, 3704, 2019)



Conclusions:

- Kerogen volume expands 11 and 5 % when adsorbing CO₂ and CH₄, respectively. Swelling increases the pore size and porosity of kerogen
- Montmorillonite swelling begins by breaking the hydrogen bond at the edges, allowing water molecules to diffuse into the dry interlayer. Early stage of swelling might result in a mechanical bending of montmorillonite layer.

Montmorillonite



Pore size becomes larger when kerogen swells

