

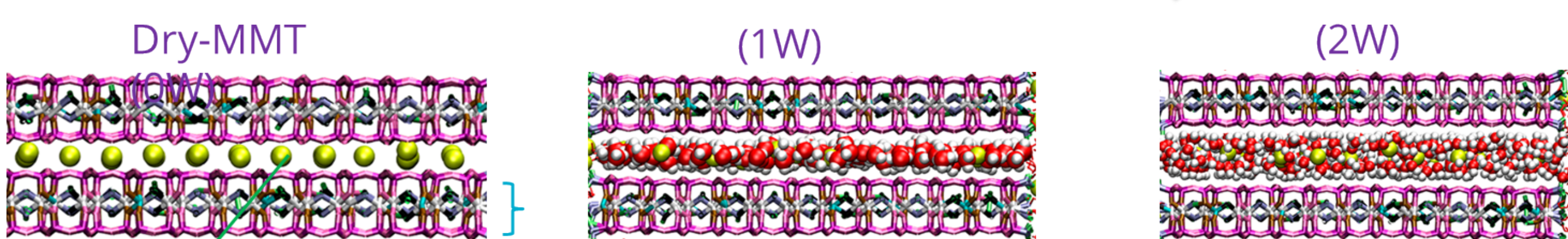
Control of surface hydrophobicity on water transport, swelling/shrinking, and intercalation of external species into clay interlayers

Tuan A. Ho

Geochemistry Department, Sandia National Laboratories, Albuquerque, NM 87123

Introduction

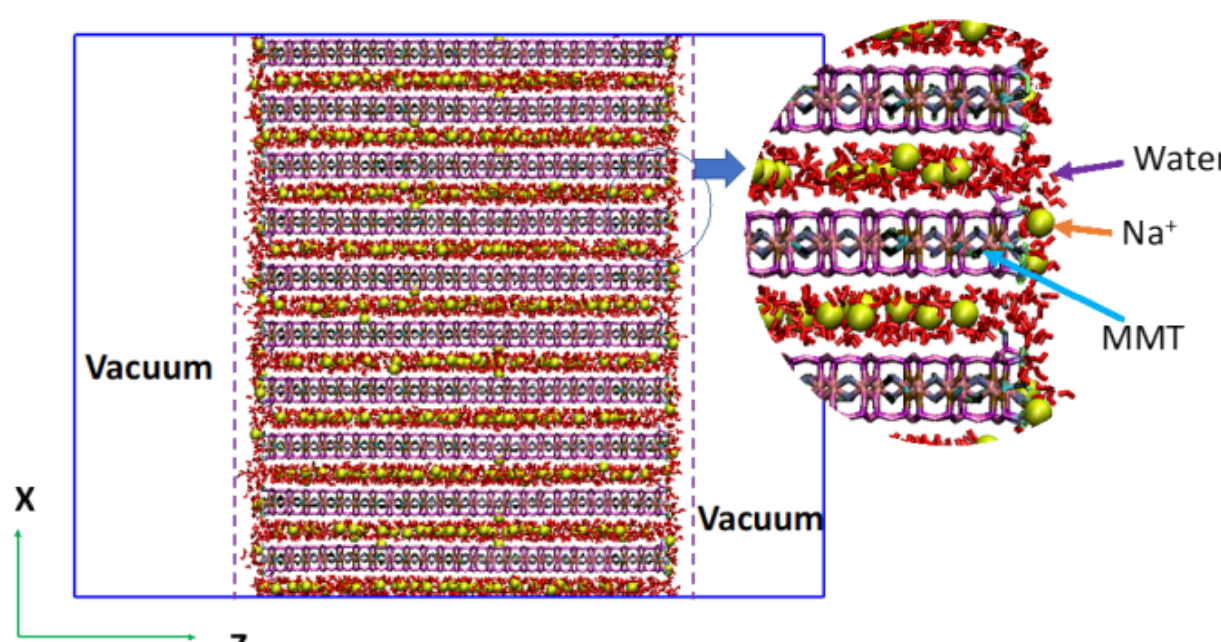
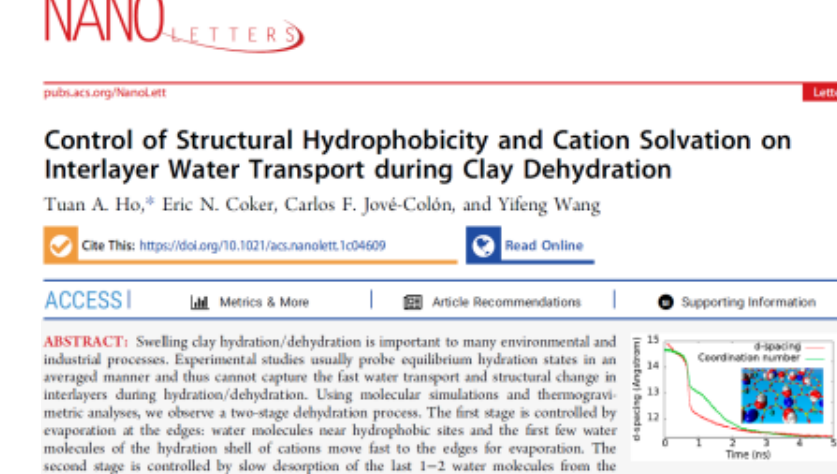
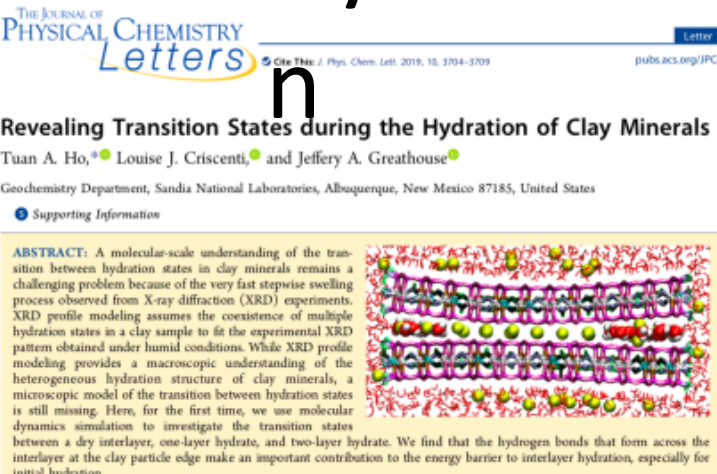
Increasing relative humidity (RH) →



Method

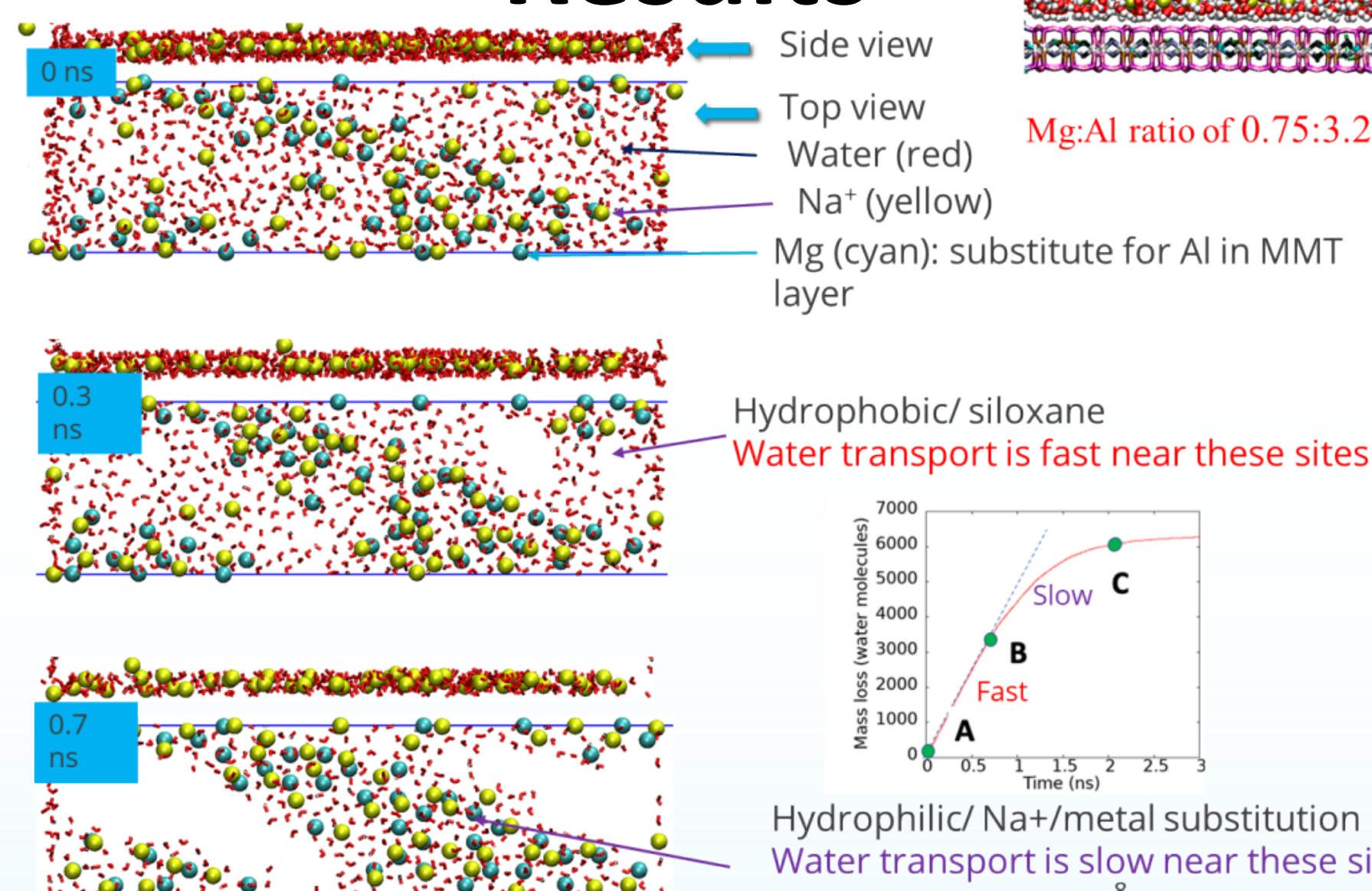
Hydration

Dehydration



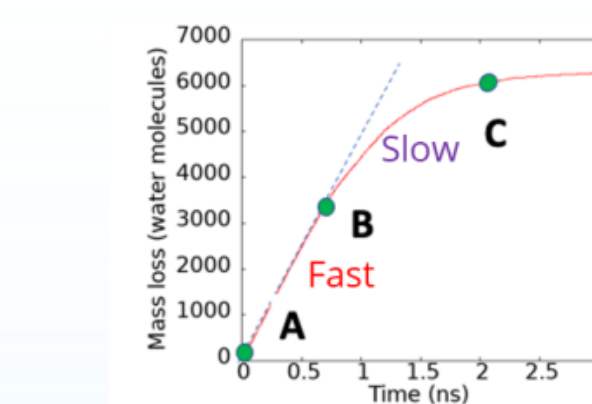
Transport pathway

Results

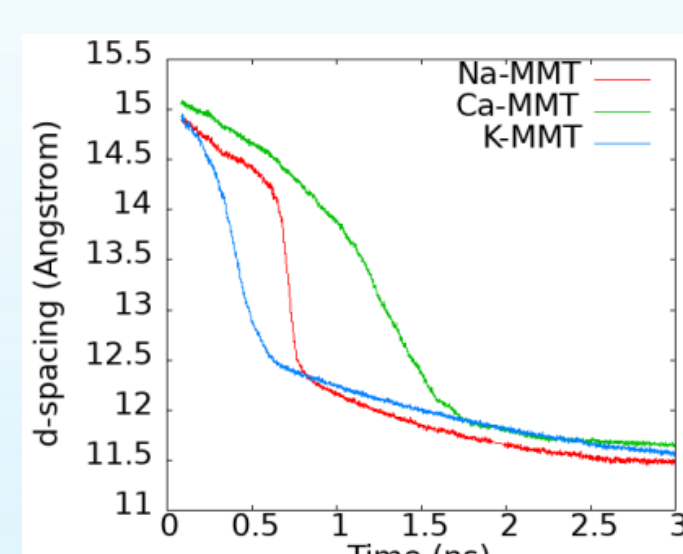


Mg:Al ratio of 0.75:3.25

Hydrophobic/siloxane
Water transport is fast near these sites

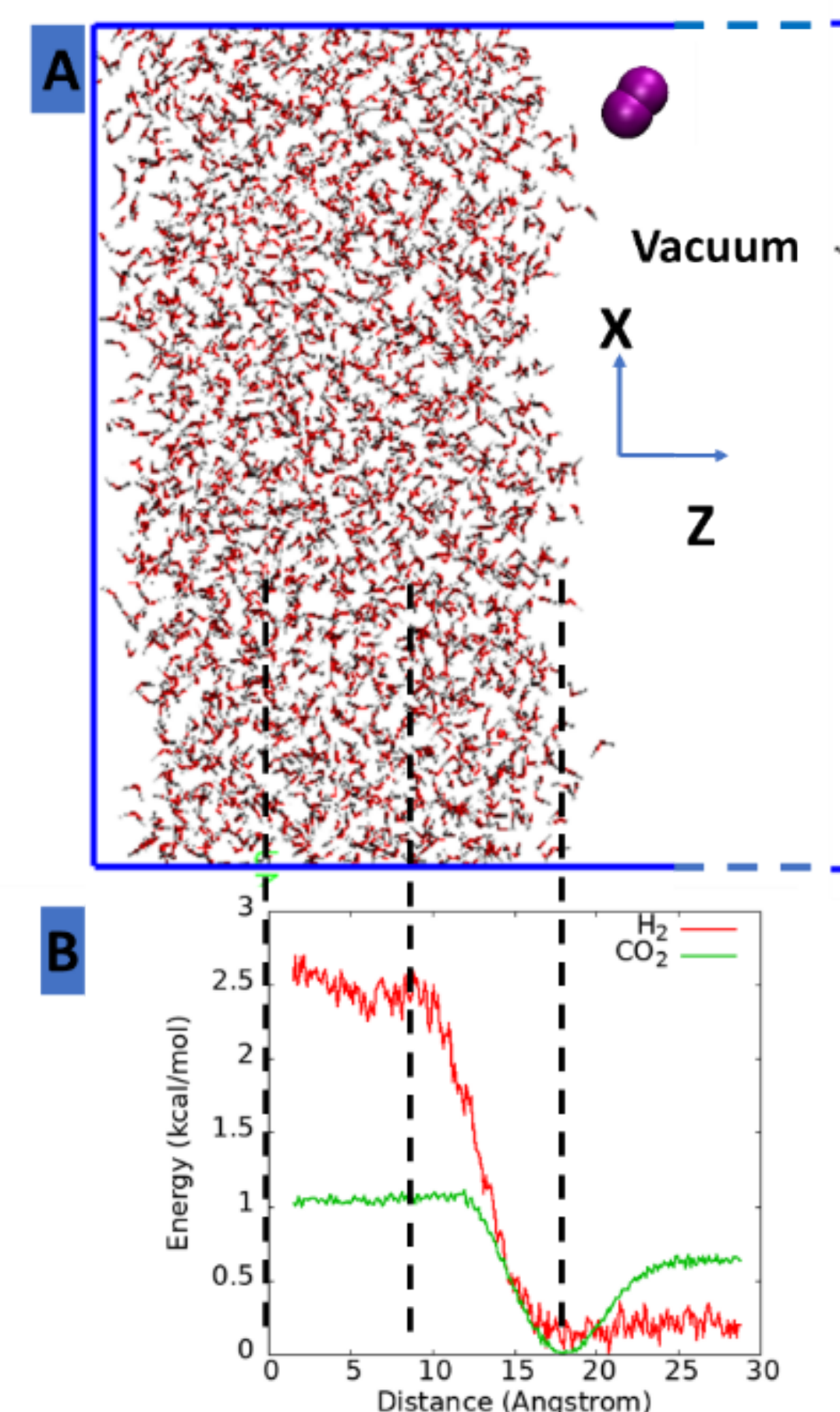


Hydrophilic/ Na+/metal substitution
Water transport is slow near these sites

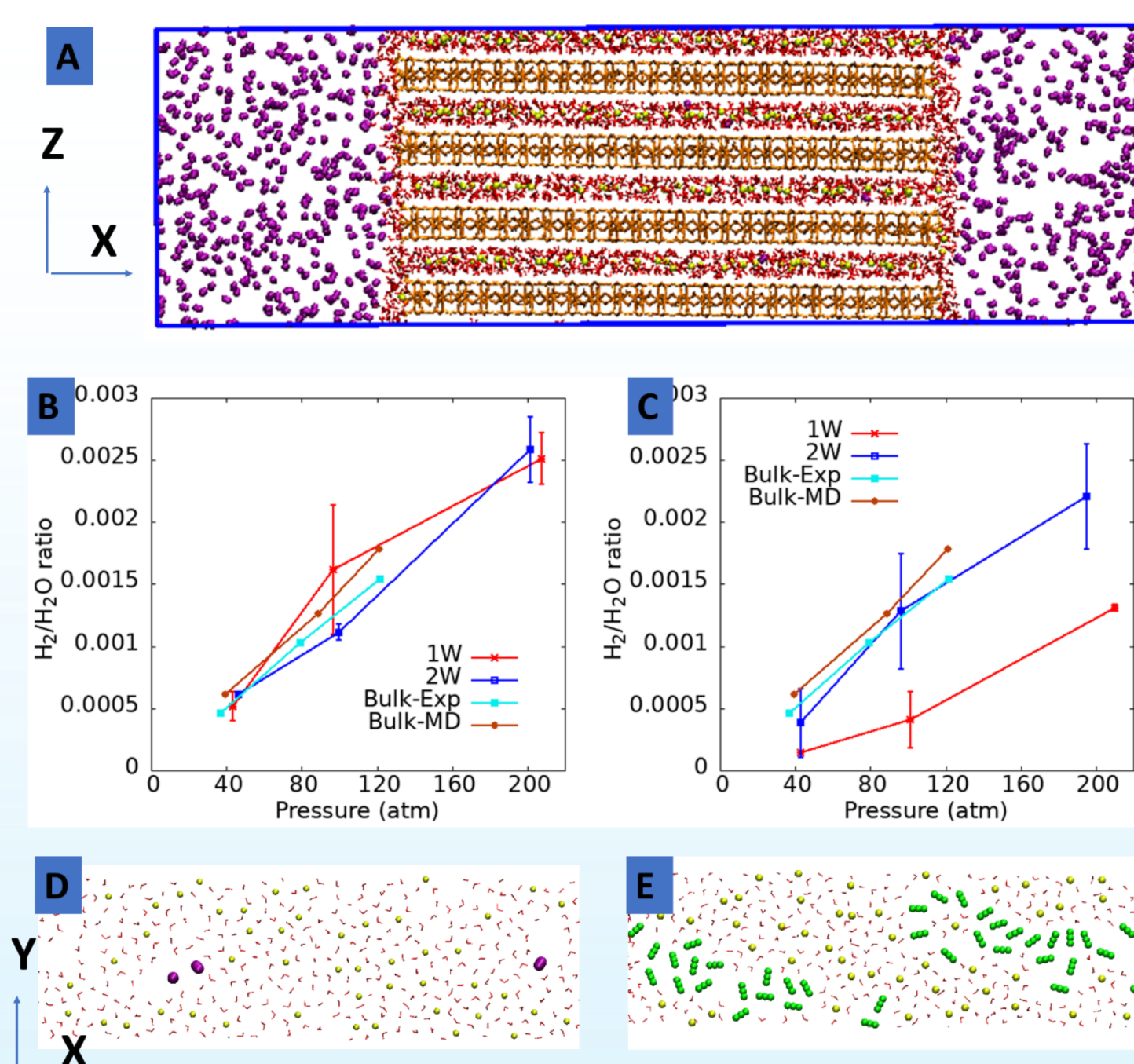


Gas intercalation into interlayers

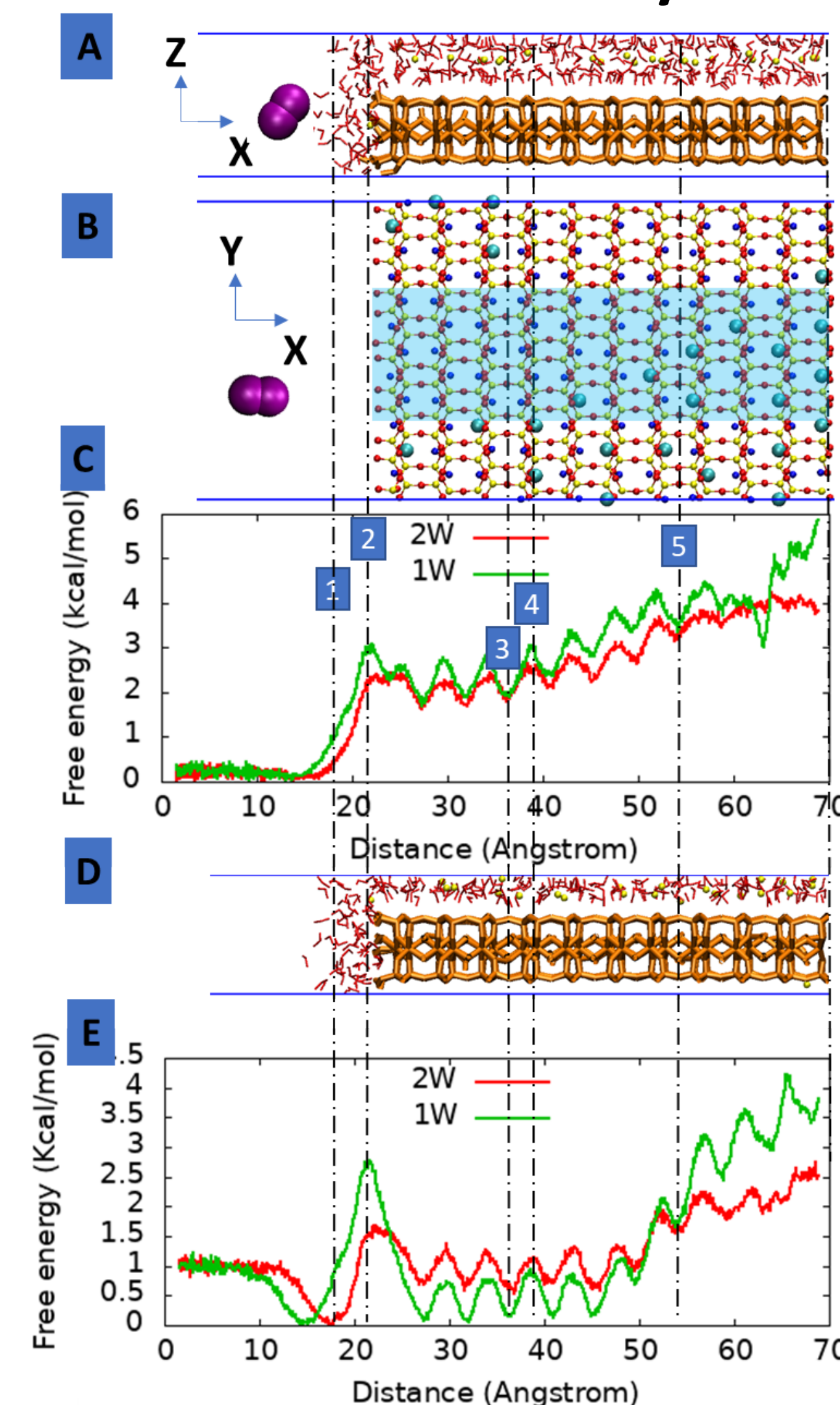
Bulk water



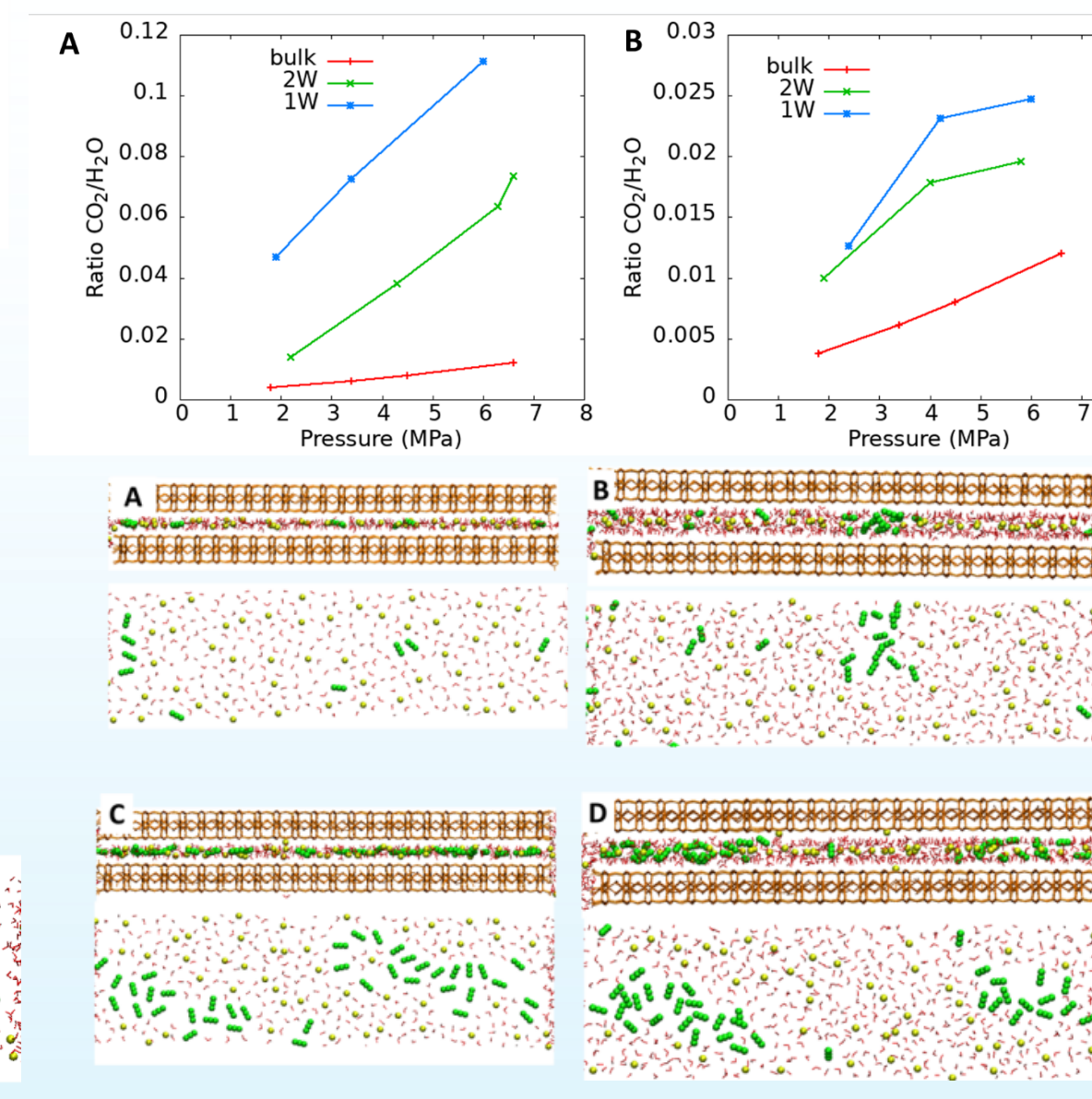
Hydrogen



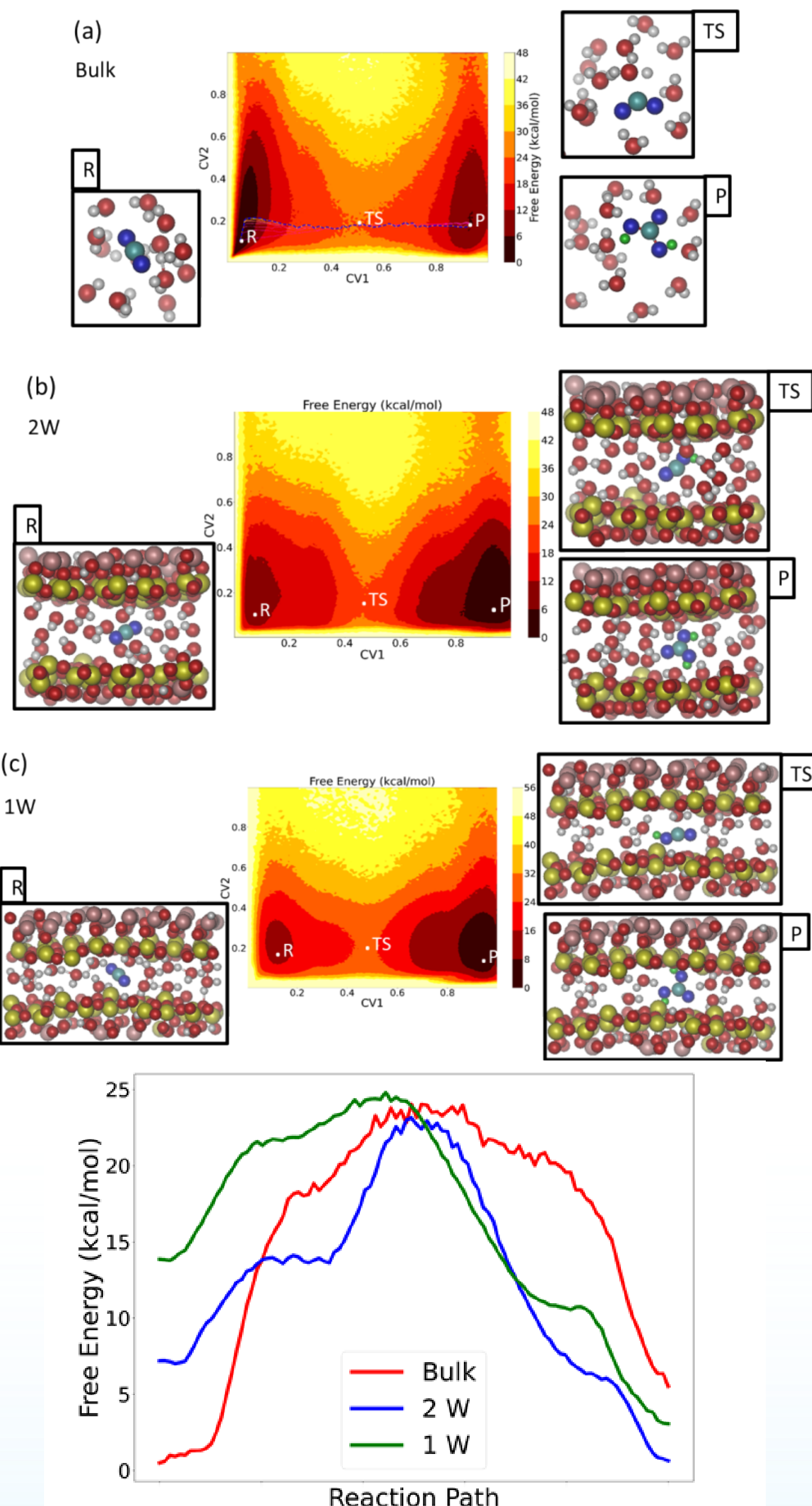
Interlayers



CO2



CO₂ conversion to H₂CO₃ in nanopores



Acknowledgement

Collaborators:

Nabankur Dasgupta
Carlos Jove-colon
Susan Rempe
Yifeng Wang

Fundings:

SFWST, LDRD