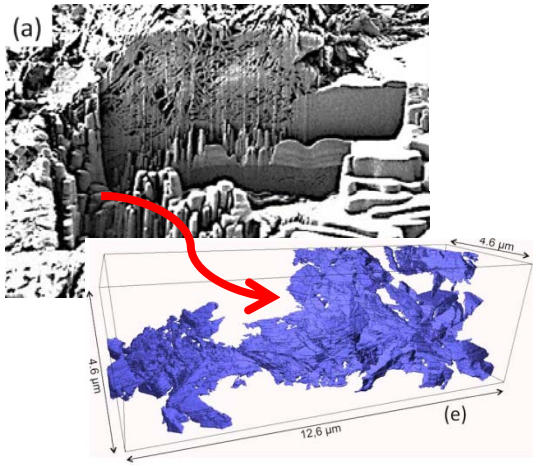
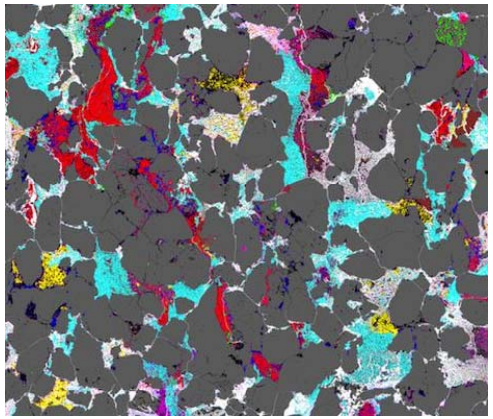
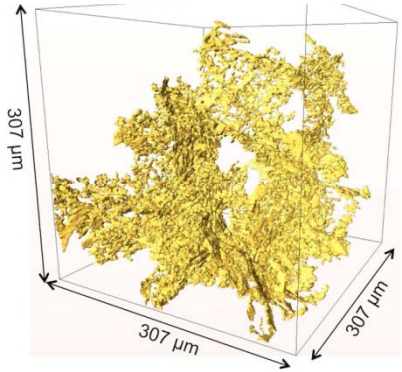
Measurement of accessible reactive surface area in a sandstone, with application to CO_2 mineralization



Clay 3D imaging using Focused Ion Beam-Scanning Electron Microscopy



Mineral distribution map from merging of SEM-Dispersive X-ray Spectroscopy and SEM-Backscattered Electron Microscopy)



3D connected pore mapping from X-ray microtomography

Scientific Achievement

Developed a 2D-3D technique for mapping hydrologically-accessible reactive surface area, with application to CO_2 sequestration at Cranfield site.

Significance and Impact

This is the first 3D mapping of reactive surface area at the nanoscale. The study provides the promise of improved quantification of this important parameter for larger scale modeling.

Research Details

- 3D imaging of nanoscale clay porosity using FIB-SEM (Molecular Foundry)
- 3D pore structure from X-ray synchrotron microtomography (ALS)
- Developed mineral distribution map based on merging of SEM-X-ray Dispersive spectroscopy and Backscattered Electron Microscopy

G. Landrot, J. B. Ajo-Franklin, L. Yang, S. Cabrini, C. I. Steefel (2012) *Chemical Geology* **318-319**, 113-125.