

When supercritical CO₂ encounters shale (kerogen), reaction happens

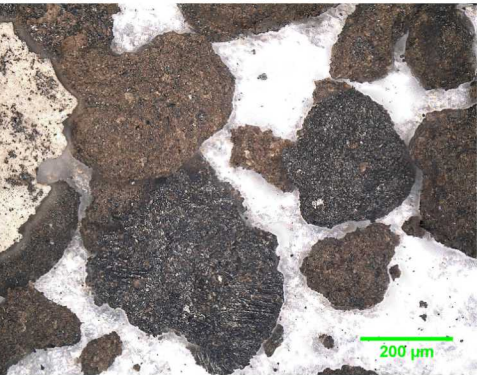
Cooking condition: 2800 psi
and 90 °C
Cooking ingredients: 130 mg
kerogen, 100mL 1M NaCl



Fresh kerogen



“cooked” 12 days



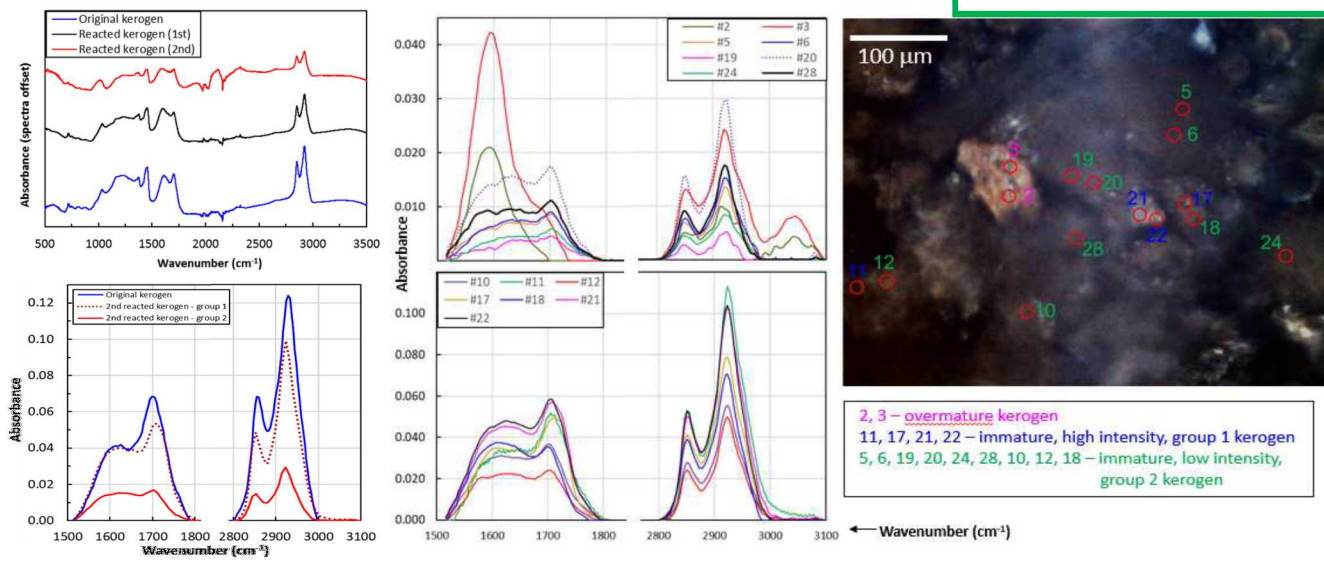
“cooked” 30 days

Changes in elemental composition

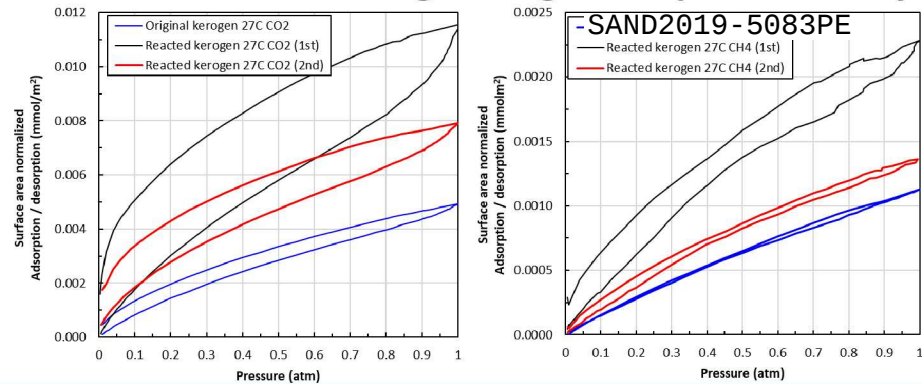
	Carbon	Hydrogen	Nitrogen	Oxygen	Sulfur	Ash
	wt %	wt %	wt %	wt %	wt %	wt %
original kerogen	73.91	7.59	2.67	8.40	2.73	3.0
1st reacted residual kerogen	72.79	7.02	2.49	11.85		
2nd reacted residual kerogen: average	62.68	4.54	1.64	12.36	1.49	24.10

	S1	S2	S3	Pyrolysable organic carbon
	mg HC/g	mg HC/g	mg CO ₂ /g	% wt
original kerogen	5.6	412.1	6.5	34.8
1st reacted residual kerogen	5.8	346.0	15.5	29.6
2nd reacted residual kerogen	1.9	181.4	13.5	15.6

Changes in infrared spectra



Changes in gas sorption ability



RESULTS:

Reaction with scCO₂ + brine

- removed functional groups, pyrolysable carbon
- reaction very heterogeneous; generated char
- increased adsorption of CO₂ and CH₄

Reaction product - Char

