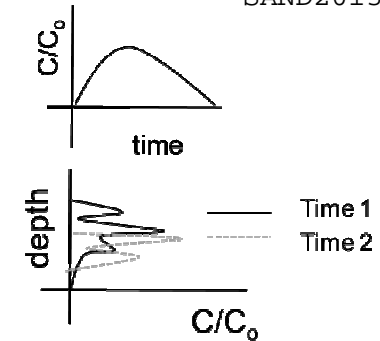
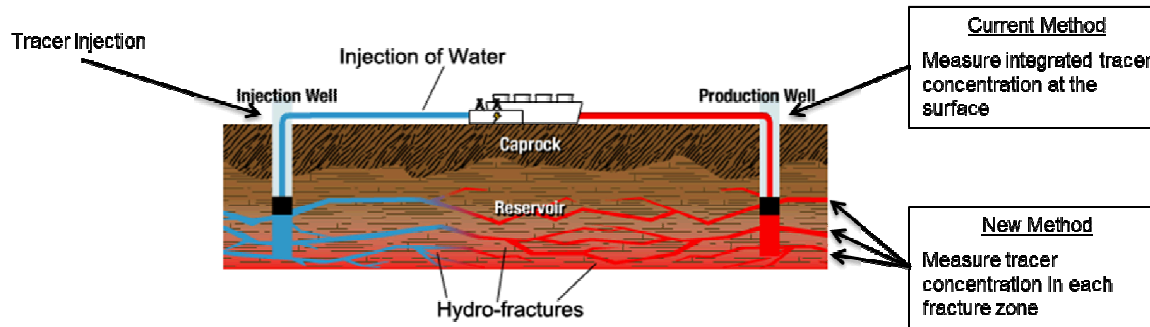
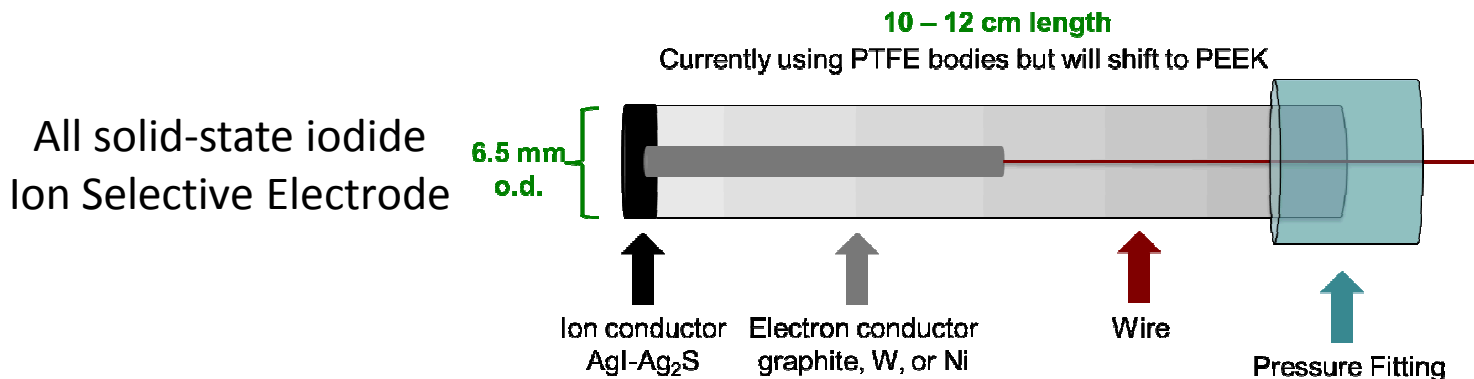


# Downhole Chemical Detection Tool

SAND2013-8132P



- Geochemists exploring geothermal reservoir properties (i.e. connectivity between fractures) would like to measure pH and tracer concentration at depth, not just at surface
  - Typical well conditions:  $T = 100 - 350\text{ }^\circ\text{C}$ ,  $P = 1000\text{'s psi}$ ,  $\text{pH} = 2 - 11$ ,  $\text{depth} = 1000 - 10,000\text{ ft}$
- Our tool is designed measure pH, T, P, and the following tracers:
  - $\text{Li}^+$ ,  $\text{Cs}^+$ ,  $\text{F}^-$ , and  $\text{I}^-$  (downhole); naphthalene sulfonates (autonomous surface mounted unit)
- Electrochemical Approach: we are building a series of high temperature and pressure stable ion selective electrodes using inorganic materials as selective membranes



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