

POLYMER FLOODS VERSUS GEL TREATMENTS

Polymer floods use polymer solutions. Gels add a crosslinker to the polymer solution.

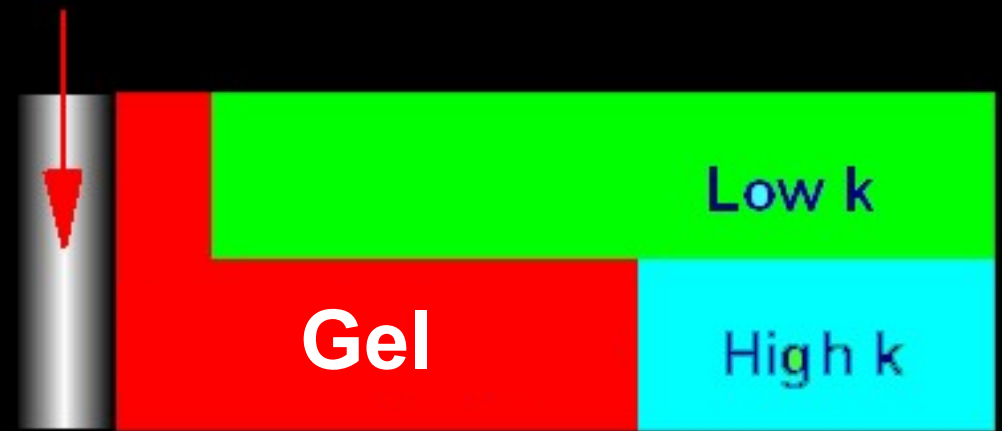
- The “Windfall Profits Act of 1980” encouraged grouping the two methods together as “polymer augmented waterfloods”.
- The Oil and Gas Journal does not distinguish the two methods in their biannual EOR survey.

What is the difference?

Distinction between a gel treatment and a polymer flood.



- For a polymer flood, polymer penetration into low-k zones should be maximized.

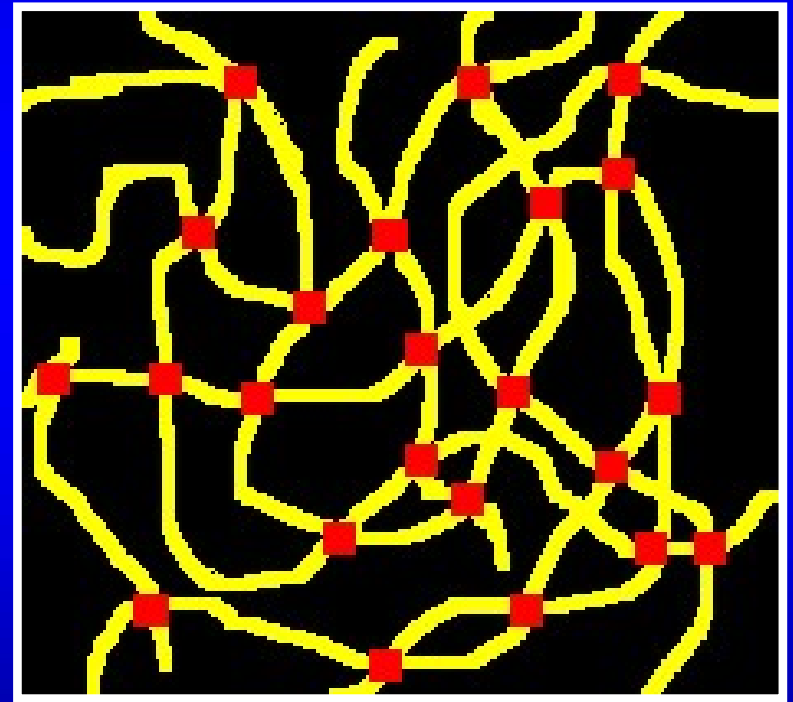


- For a gel treatment, gelant penetration into low-k zones should be minimized.

**VISCOUS
POLYMER
SOLUTION**

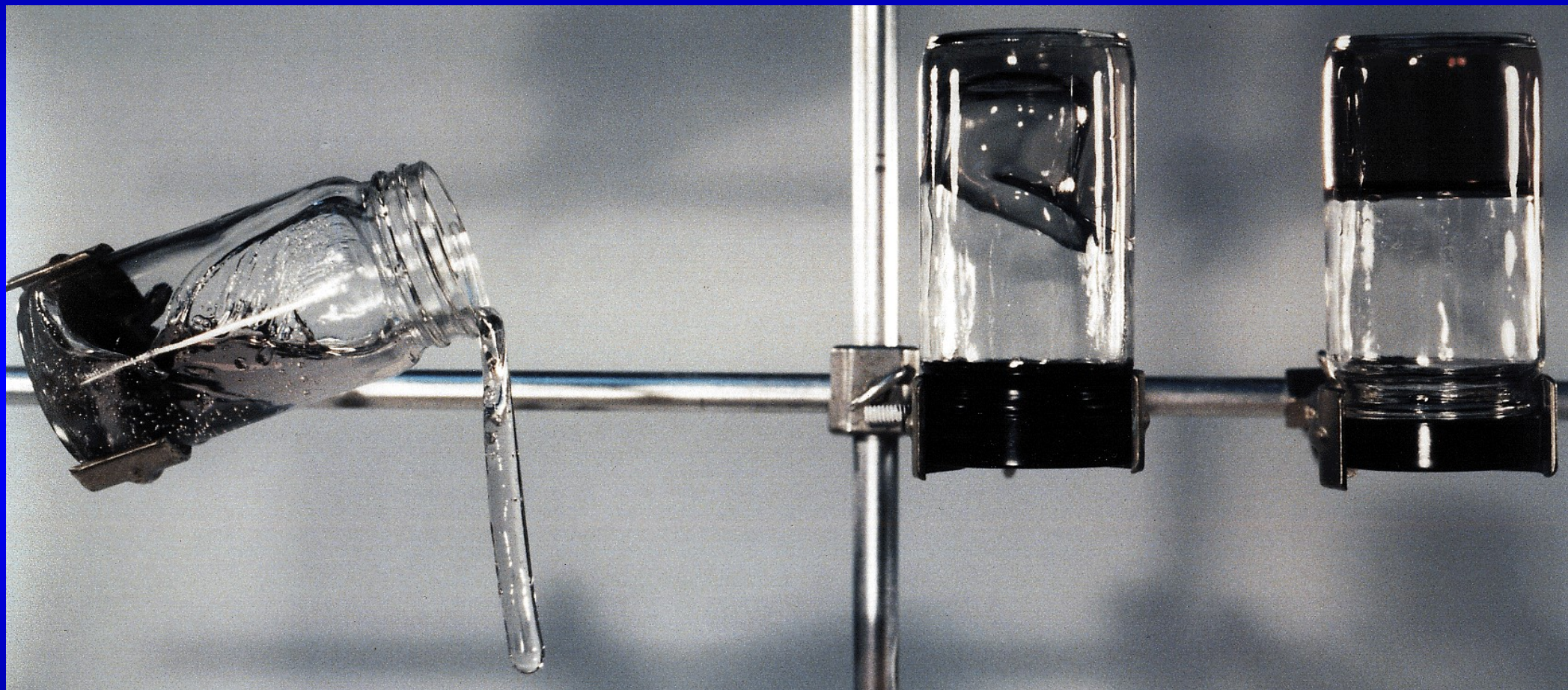
**CROSSLINKED
POLYMER
(GEL)**

■ Crosslink site



Gelant = Polymer + crosslinker solution before gel formation.
Gel = Crosslinked structure after reaction.

Higher polymer & crosslinker concentrations yield stronger gels



If not enough polymer or crosslinker is present, no gel forms.

PROPERTIES OF AVAILABLE GELANTS/GELS

- 1. Early in the gelation process, gelants penetrate readily into porous rock.**
- 2. After gelation, gel propagation through porous rock stops.**
- 3. The transition between these two conditions is usually of short duration.**

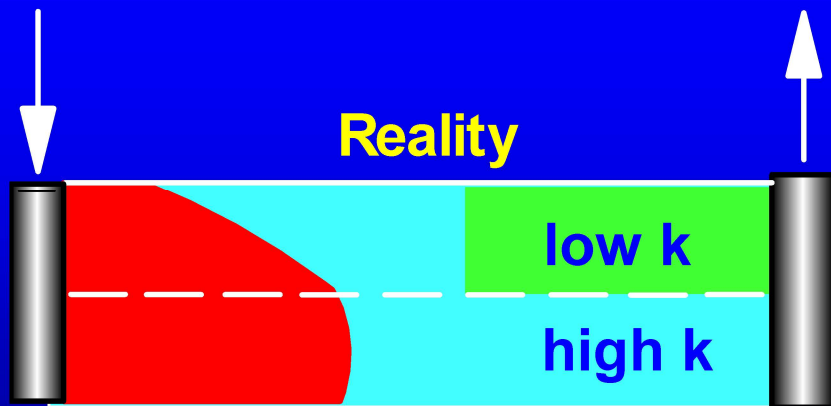
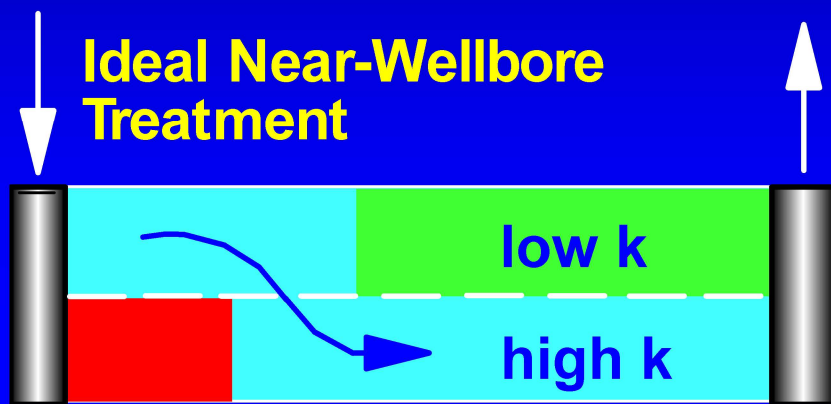
***SPE*RE (Nov. 1993) 299-304; *IN SITU* 16(1) (1992) 1-16; and *SPE*PF (Nov. 1995) 241-248.**

GEL TREATMENTS ARE NOT POLYMER FLOODS

Crosslinked polymers, gels, gel particles, and “colloidal dispersion gels”:

- Are not simply viscous polymer solutions.
- Do not flow through porous rock like polymer solutions.
- Do not enter and plug high-k strata first and progressively less-permeable strata later.
- Should not be modeled as polymer floods.

UNFRACTURED RESERVOIRS WITH CROSSFLOW



Water Oil Gel

POLYMER FLOODING is best for improving sweep in reservoirs where fractures do not cause severe channeling.

- Great for improving the mobility ratio.
- Great for overcoming vertical stratification.
- Fractures can cause channeling of polymer solutions and waste of expensive chemical.

GEL TREATMENTS are best treating fractures and fracture-like features that cause channeling.

- Generally, low volume, low cost.
- Once gelation occurs, gels do not flow through rock.