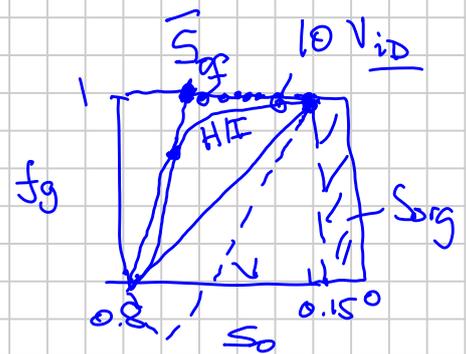


GAS INJECTION EOR (Pore-Level Recovery)

- ① Purely Immiscible
- ② Vaporization-Dominated
- ③ Swelling-Viscosity Reduction
- ④ Multi-Contact Miscible
- ⑤ Unconventional
 - Naturally Fractured
 - Shale "Ultra-Tight"
 - Steam



① Purely Immiscible

* No component exchange between reservoir phases

- 1D BL displacement ($k_r, \mu \Rightarrow \lambda$) $S_{oi} \rightarrow S_{og}$
slow
80% 55% → 15%
@ IAI
- 2D BL (Vertical Flow, Gravity)
high k

⇒ Leaky Piston

$S_{oi} \rightarrow S_{og}$
Fast
@ IPII

② Vaporization-Dominated

- Light oil ($>35^\circ \text{API}$) / Condensate ($>45-50^\circ$)

$C_2-15(\text{ca})$
Light
Heavies

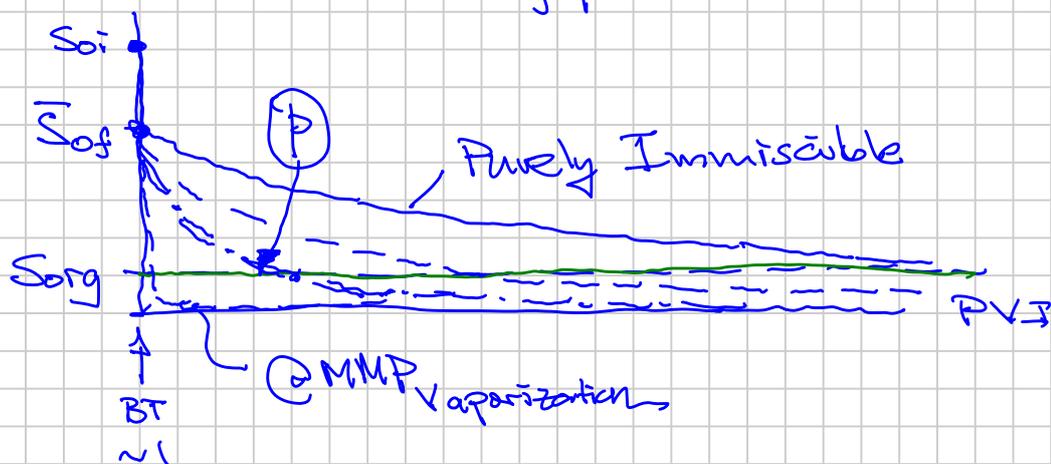
- High Pressure

- Net component transfer from RO phase to RG(IG) phase

$$K_i = \frac{y_i}{x_i}$$

- $BW \Rightarrow \sum_{i=1}^n S_{oi} \Rightarrow 0$ (low value)
= $f(p)$

higher K_i \uparrow
RG
RO



③ Swelling-Viscosity Reductions

- Heavier Oil ($22-32^\circ \text{API}$)

$$\mu_o \sim 5-50 \Rightarrow 1-10$$

- Lower $p_R < 3500$ psia

$$V_{oi} \rightarrow V_{os} \sim 1.2 \rightarrow 2^+$$

- Undersaturated Oils

- Injection Gas: HCs C_1
 C_2-C_4 also

CO_2

- Can be / often used together with water injection (WAG)

and alternating

