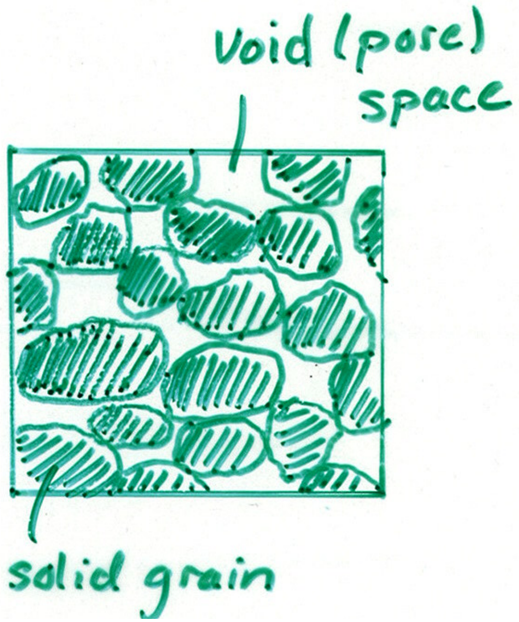
Porous Media



Volume of void space V_p

Volume of solid V_s

Total Volume $V = V_p + V_s$

Porosity

$$\phi = \frac{Vp}{V}$$

a detailed distribution of void (pore) space is not usually measurable

Macroscopic Properties

- porosity (pore volume fraction)
- specific surface area (ratio of solid volume to surface area)
- permeability (ease of fluid flow)
- electrical formation factor (influence of geometry on electrical conductivity)

Determining Porosity

1) Density Method

- measure mass M and volume V of sample
- calculate density $\rho = M/V$

compare ρ with known density of solid grains ρ_s

$$M = \rho_s V_s = \rho_s(1-\phi)V$$

equate M and solve for ϕ

$$\phi = \frac{\rho_s - \rho}{\rho_s}$$