Adsorption+Decay

$$R\frac{\partial C}{\partial t} = -v\frac{\partial C}{\partial x} - \mu C$$

$$R = 1 + \rho\frac{K_d}{n}$$

$$\mu = \mu_a + \mu_s \rho\frac{K_d}{n}$$

$$C(x,t) = 0 \text{ when } x \le v\frac{t}{R} - L$$

$$C(x,t) = C_o \exp(-\mu\frac{x}{v}) \text{ when } v\frac{t}{R} - L \le x \le v\frac{t}{R}$$

$$C(x,t) = 0 \text{ when } x > v\frac{t}{R}$$

Absorbtion (Linear)

$$R\frac{\partial C}{\partial t} = -v\frac{\partial C}{\partial x};$$

$$R = 1 + \rho\frac{K_d}{n}$$

$$C(x,t) = 0 \text{ when } x \leq v\frac{t}{R} - L$$

$$C(x,t) = C_o \text{ when } v\frac{t}{R} - L \leq x \leq v\frac{t}{R}$$

$$C(x,t) = 0 \text{ when } x > v\frac{t}{R}$$

1st Order Decay

$$\frac{\partial C}{\partial t} = -v\frac{\partial C}{\partial x} - \mu_a C$$

$$C(x,t) = 0 \text{ when } x \le vt - L$$

$$C(x,t) = C_o \exp(-\mu_a \frac{x}{v}) \text{ when } vt - L \le x \le vt$$

$$C(x,t) = 0 \text{ when } x > vt$$