3

Dispersion in Porous Media

Shijie Liu and Jacob H. Masliyah

CONTENTS

Dispersion is a well-known phenomenon in porous media primarily for heat and mass transfer. Like viscosity in momentum transfer, heat conductivity in heat transfer, and diffusion coefficient in mass transfer, dispersion coefficient is a property valid only under continuum assumptions. Dispersion causes fluid (velocity, molecules, and temperature) to distribute evenly, which is directly analogous to mass diffusion (Fickian diffusion) and viscous stress. Fickian diffusion causes molecules to distribute evenly, whereas viscous stress causes flow velocity to be distributed evenly. However, dispersion is caused due to the fluctuations of bulk flow, whereas diffusion is caused due to random molecular motion.

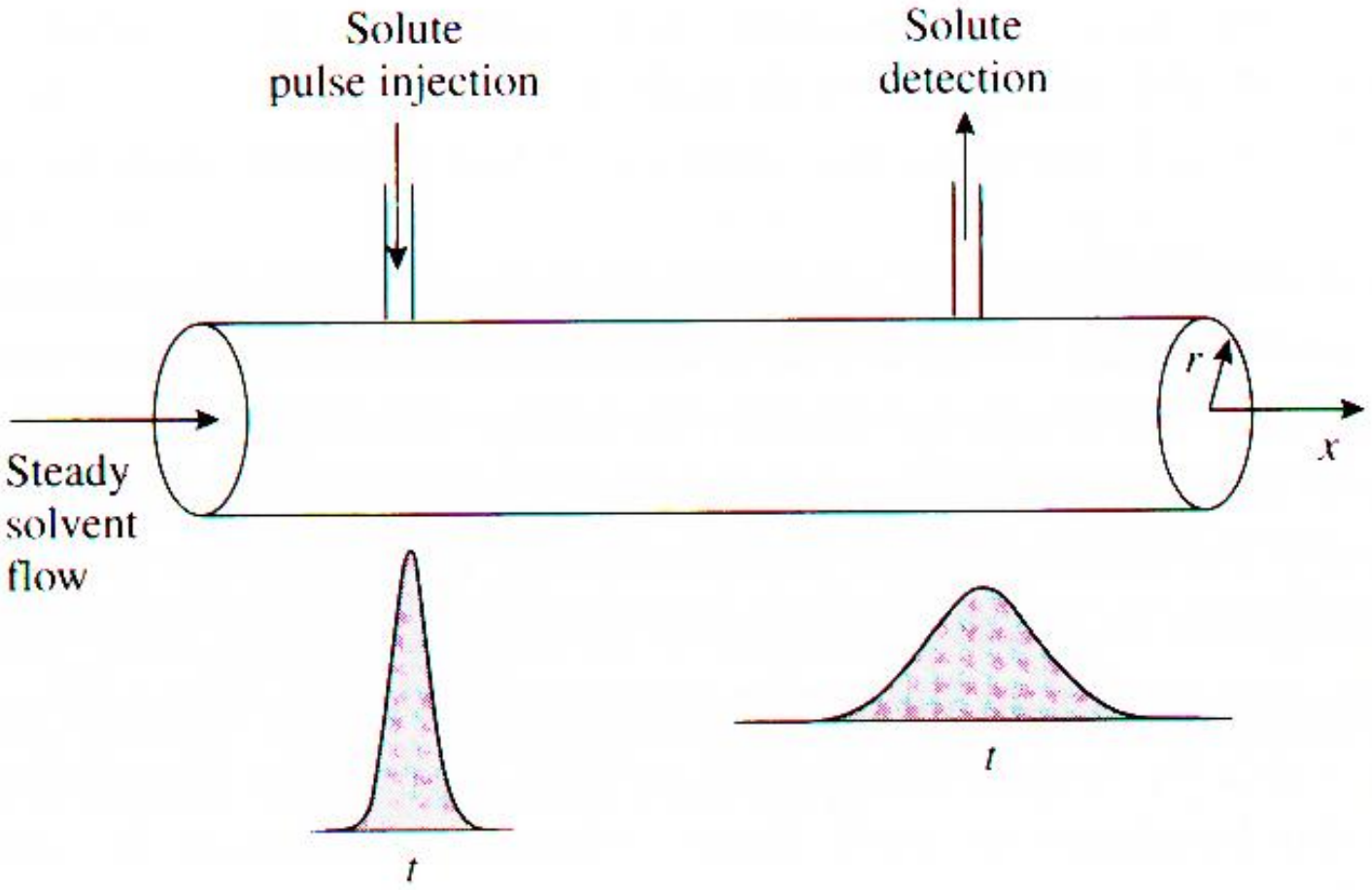

FIGURE 3.1
Taylor dispersion experiment set-up.