

Exercise 15

The Villermaux-Dushman protocol was used to characterize the mixing in a circular micro-channel.

Experimental data

Flowrate (ml/min)	4	6	8	10	12
Absorbance (-)	0.623	0.463	0.355	0.320	0.258

Physical properties and geometric factors

Temperature: $T = 298 K$

Kinematic viscosity: $\nu = 10^{-6} m^2 \cdot s^{-1}$

Concentration set used: 2b

Optical path length: $l = 10 mm$

Micro-channel diameter: $d_t = 0.5 mm$

Equal volumetric flowrates of both solutions

Questions

For each of the experimental data, calculate:

- The segregation index
- The power dissipation
- The mixing time

Plot the mixing time as function of the power dissipation.

Compare the $t_{mx} = f(\varepsilon)$ data with the general relationships found for micromixers.