A7q6 comsol

Report date

Oct 16, 2025, 10:17:16 PM

Contents

1 Global Definitions

Date	Oct 16, 2025, 10:10:36 PM

GLOBAL SETTINGS

Name	A7q6 comsol.mph
Path	E:\Comsol codes\a7q6_comsol.mph
Version	COMSOL Multiphysics 6.0 (Build: 318)

USED PRODUCTS

COMSOL Multiphysics
Battery Design Module

COMPUTER INFORMATION

CPU	Intel64 Family 6 Model 142 Stepping 12, 2 cores
Operating system	Windows 10

1.1 PARAMETERS

PARAMETERS 1

Name	Expression	Value	Description
L	0.08[m]	0.08 m	
H	0.02[m]	0.02 m	
R	2	2	
U	1[mm/s]	0.001 m/s	
mu1	1[mPa*s]	0.001 Pa·s	
rho	1000[kg/m^3]	1000 kg/m³	
D	4e-8[m^2/s]	4E−8 m²/s	
kappa	1e-6[m^2]	1E−6 m²	
x0	0.01[m]	0.01 m	
delta	1e-4[m]	1E−4 m	
epsilon	0.1	0.1	
c2	10[mol/m^3]	10 mol/m³	

2 Component 1

2.1 DEFINITIONS

2.1.1 Coordinate Systems

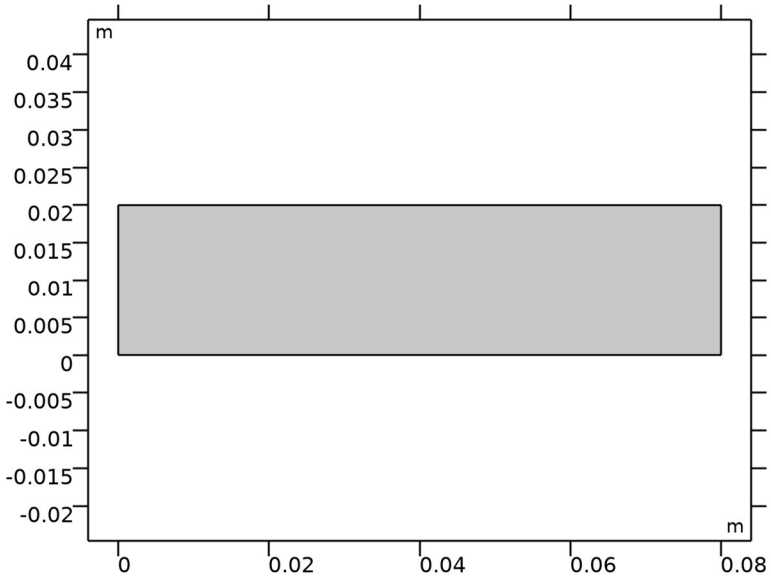
Boundary System 1

Coordinate system type	Boundary system
Tag	sys1

COORDINATE NAMES

First	Second	Third
t1	n	to

2.2 GEOMETRY 1

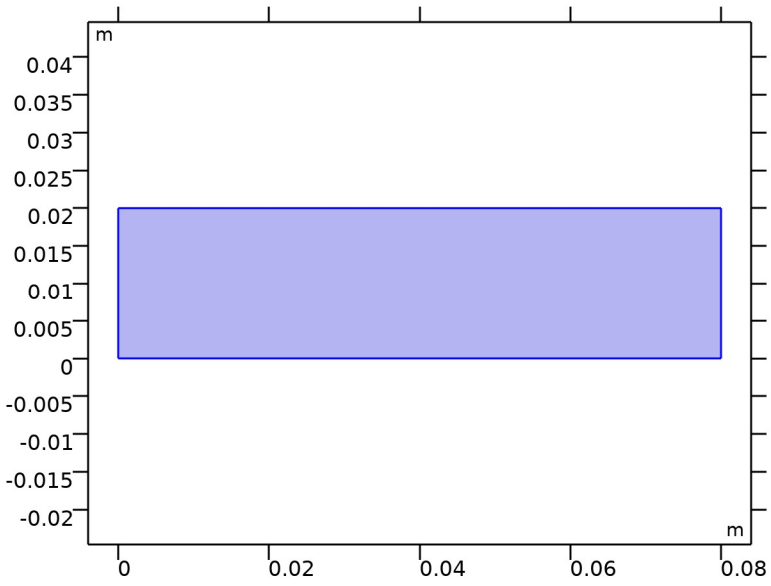


Geometry 1

UNITS

Length unit	m
Angular unit	deg

2.3 DARCY'S LAW



Darcy's Law

EQUATIONS

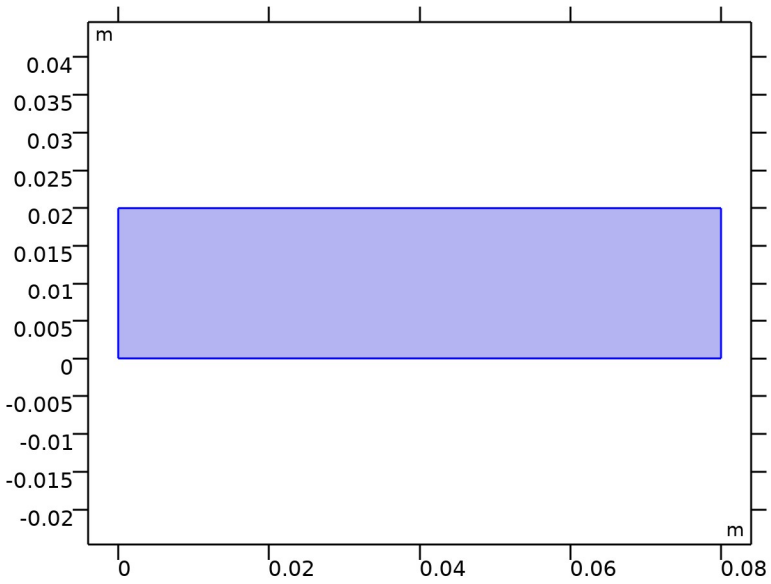
$$\frac{\partial}{\partial t}(\epsilon_p \rho) + \nabla \cdot (\rho \mathbf{u}) = Q_m$$

$$\mathbf{u} = -\frac{\kappa}{\mu}\nabla p$$

FEATURES

Name	Level
Porous Medium 1	Domain
No Flow 1	Boundary
Initial Values 1	Domain
Inlet 1	Boundary
Outlet 1	Boundary

2.4 TRANSPORT OF DILUTED SPECIES IN POROUS MEDIA



Transport of Diluted Species in Porous Media

EQUATIONS

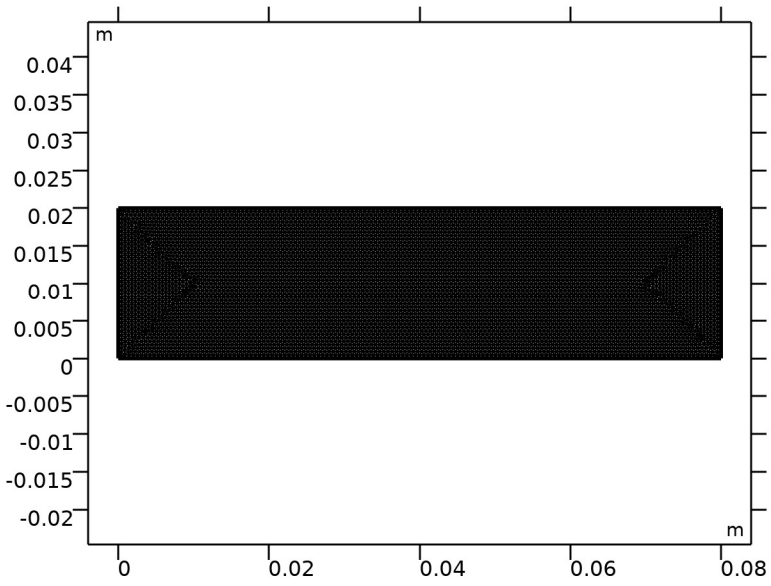
$$\frac{\partial(\epsilon_p c_i)}{\partial t} + \frac{\partial(\rho c_{P,i})}{\partial t} + \nabla \cdot \mathbf{J}_i + \mathbf{u} \cdot \nabla c_i = R_i + S_i$$

$$\mathbf{J}_i = -(D_{D,i} + D_{e,i})\nabla c_i$$

FEATURES

Name	Level
Porous Medium 1	Domain
No Flux 1	Boundary
Initial Values 1	Domain
Inflow 1	Boundary
Outflow 1	Boundary

2.5 MESH 1



Mesh 1

3 Study 1

COMPUTATION INFORMATION

Computation time	3 min 59 s

3.1 PARAMETRIC SWEEP

Parameter name	Parameter value list
epsilon	0.1 0.5 0.75

STUDY SETTINGS

Description	Value
Sweep type	Specified combinations
Parameter name	epsilon
Unit	

PARAMETERS

Parameter name	Parameter value list	Parameter unit
epsilon	0.1 0.5 0.75	

3.2 TIME DEPENDENT

Times	Unit
range(0,0.1,15)	s

STUDY SETTINGS

Description	Value
Include geometric nonlinearity	Off

STUDY SETTINGS

Description	Value
Output times	{0, 0.1, 0.2, 0.30000000000000004, 0.4, 0.5, 0.6000000000000001, 0.7000000000000001, 0.8, 0.9, 1, 1.1, 1.2000000000000002, 1.3, 1.4000000000000001, 1.5, 1.6, 1.7000000000000002, 1.8, 1.9000000000000001, 2, 2.1, 2.2, 2.3000000000000003, 2.4000000000000004, 2.5, 2.6, 2.7, 2.8000000000000003, 2.9000000000000004, 3, 3.1, 3.2, 3.3000000000000003, 3.4000000000000004, 3.5, 3.6, 3.7, 3.8000000000000003, 3.9000000000000004, 4, 4.1000000000000005, 4.2, 4.3, 4.4, 4.5, 4.6000000000000005, 4.7, 4.800000000000001, 4.9, 5, 5.1000000000000005, 5.2, 5.300000000000001, 5.4, 5.5, 5.6000000000000005, 5.7, 5.800000000000001, 5.9, 6, 6.1000000000000005, 6.2, 6.300000000000001, 6.4, 6.5, 6.6000000000000005, 6.7, 6.800000000000001, 6.9, 7, 7.1000000000000005, 7.2, 7.300000000000001, 7.4, 7.5, 7.6000000000000005, 7.7, 7.800000000000001, 7.9, 8, 8.1, 8.200000000000001, 8.3, 8.4, 8.5, 8.6, 8.700000000000001, 8.8, 8.9, 9, 9.1, 9.200000000000001, 9.3, 9.4, 9.5, 9.600000000000001, 9.700000000000001, 9.8, 9.9, 10, 10.100000000000001,

Description	Value
	10.200000000000001, 10.3, 10.4, 10.5, 10.600000000000001, 10.700000000000001, 10.8, 10.9, 11, 11.100000000000001, 11.200000000000001, 11.3, 11.4, 11.5, 11.600000000000001, 11.700000000000001, 11.8, 11.9, 12, 12.100000000000001, 12.200000000000001, 12.3, 12.4, 12.5, 12.600000000000001, 12.700000000000001, 12.8, 12.9, 13, 13.100000000000001, 13.200000000000001, 13.3, 13.4, 13.5, 13.600000000000001, 13.700000000000001, 13.8, 13.9, 14, 14.100000000000001, 14.200000000000001, 14.3, 14.4, 14.5, 14.600000000000001, 14.700000000000001, 14.8, 14.9, 15}

PHYSICS AND VARIABLES SELECTION

Physics interface	Discretization
Darcy's Law (dl)	physics
Transport of Diluted Species in Porous Media (tds)	physics

MESH SELECTION

Geometry	Mesh
Geometry 1 (geom1)	mesh1

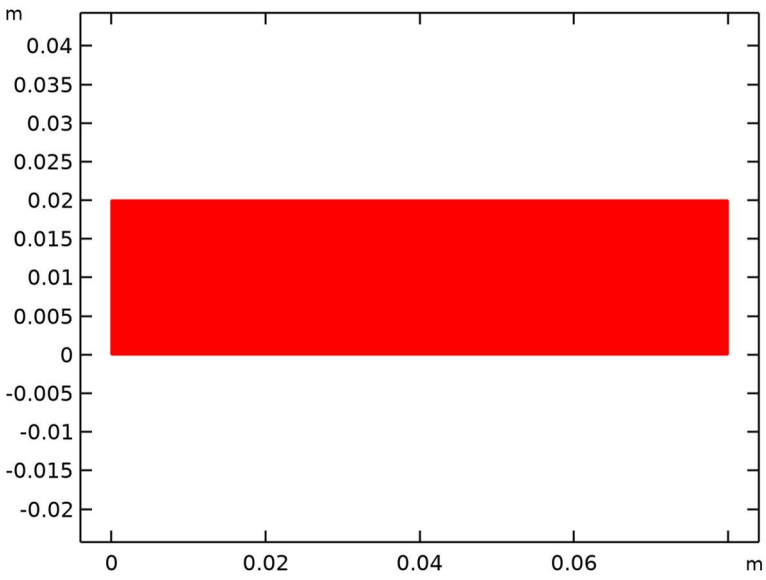
4 Results

4.1 DATASETS

4.1.1 Study 1/Solution 1

SOLUTION

Description	Value
Solution	Solution 1
Component	Component 1 (comp1)

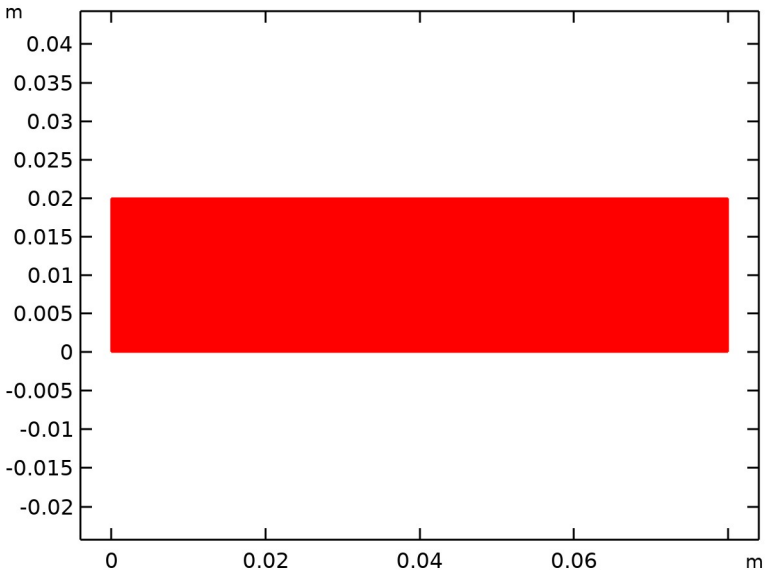


Dataset: Study 1/Solution 1

4.1.2 Study 1/Parametric Solutions 1

SOLUTION

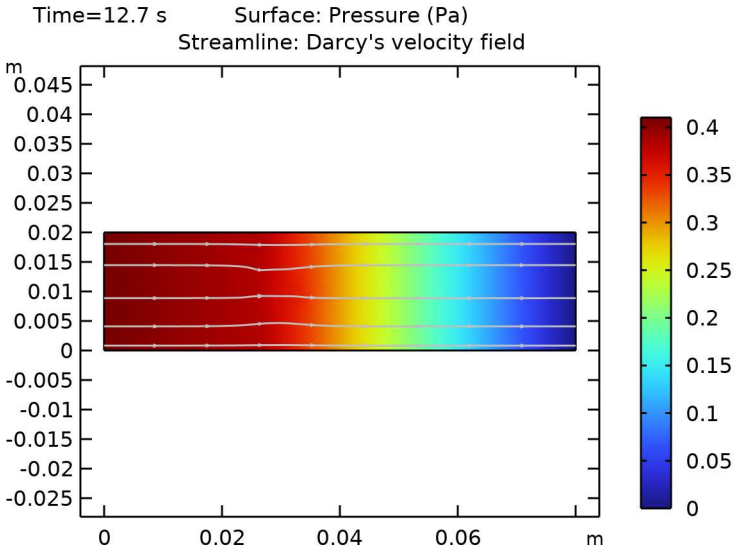
Description	Value
Solution	Parametric Solutions 1
Component	Component 1 (comp1)



Dataset: Study 1/Parametric Solutions 1

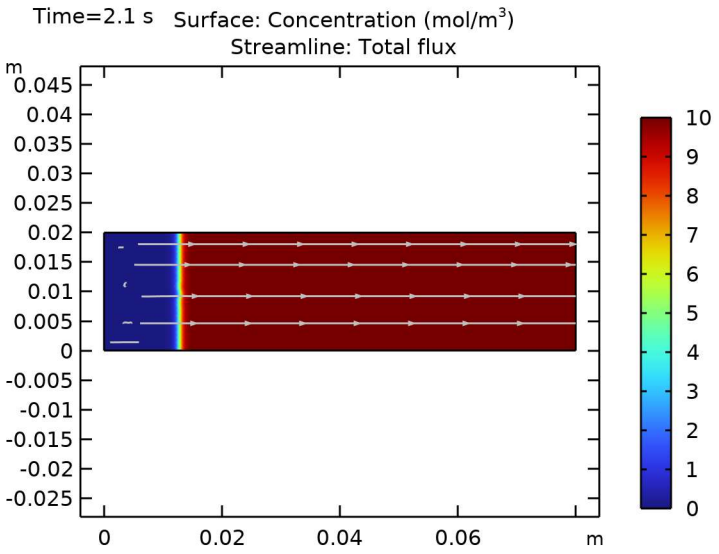
4.2 PLOT GROUPS

4.2.1 Pressure (dl)



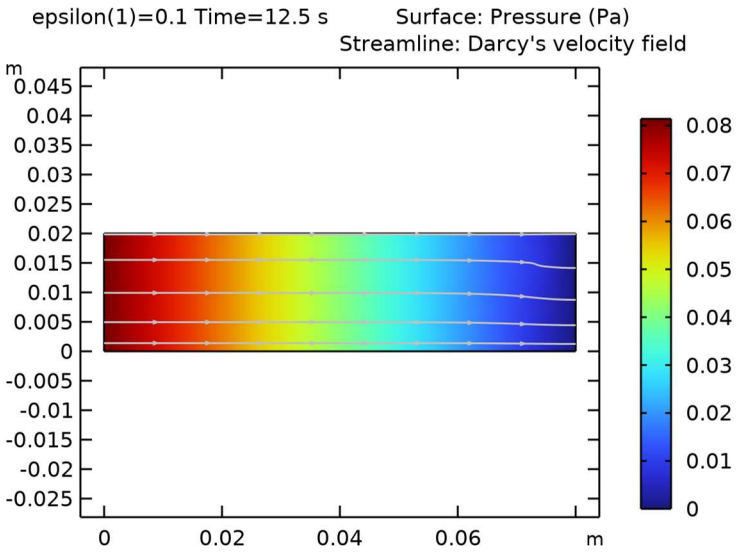
Surface: Pressure (Pa) Streamline: Darcy's velocity field

4.2.2 Concentration (tds)



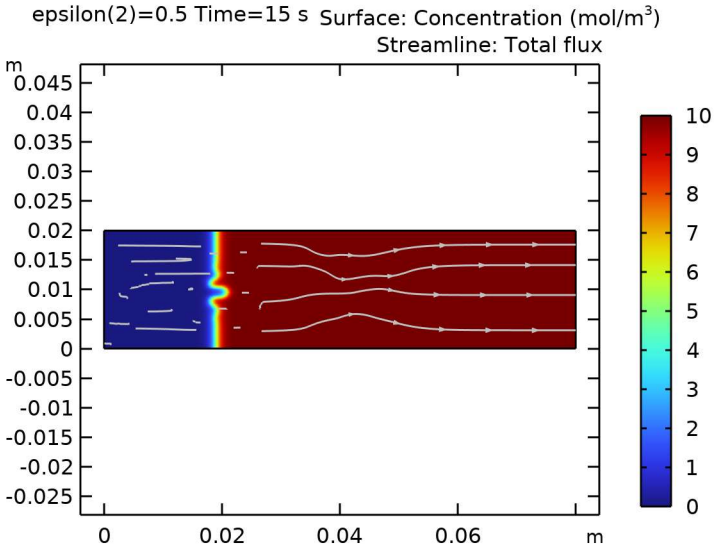
Surface: Concentration (mol/m³) Streamline: Total flux

4.2.3 Pressure (dl) 1



Surface: Pressure (Pa) Streamline: Darcy's velocity field

4.2.4 Concentration (tds) 1



Surface: Concentration (mol/m³) Streamline: Total flux