

The data sets are a part of PhD thesis “Particle added foam flow through porous media near the critical micelle concentration”. The data sets mainly contain COMSOL Model file type, with the extension .mph. It is the default file type containing the entire model tree and application tree from the Model Builder and Application Builder, respectively. The file contains both binary and text data. The mesh and solution data is stored as binary data, while all other information is stored as plain text.

In multiphysics program COMSOL we used a mathematical formulation with a bubble population function by history matching the experiments. The two-phase flow model that leads to four equations, viz., a pressure equation, a water saturation equation, a bubble density equation and a surfactant transport-adsorption equation is used to describe the pressure drop during the foam flow experiments. Within the model, the rate of change of bubble density during the transient state is equated to the bubble density generation function plus the terms accounting for the bubble transport, i.e., by convection and diffusion divided by the porosity saturation product.

The data sets contain folders for three porous media: Bentheimer, coarse sandpack and fine sandpack. Each folder contains comsol files, excel files about the relevant information and text files. The folder Bentheimer contains subfolder about the adsorption case. Further Bentheimer case contains three folders, for each edition of the paper submitted to Transport in porous media. Thus, Folder September 2015 contains the final version of the COMSOL files. The files for coarse and fine sandpack have no matching results with the experiments, therefore did not make it in the thesis. It is a challenge to reader to attempt simulation results similar to the experimental results.

Extensive methodology and explanation of the existence and interpretation of the data can be found in the chapter 3 of the PhD thesis [10.4233/uuid:3f1d641a-d173-43ae-8799-1550f0c71b91](https://doi.org/10.4233/uuid:3f1d641a-d173-43ae-8799-1550f0c71b91). Specific questions can be asked to Rahul Thorat, email : rahul@thorat.net