Contribution ID: **626** Type: **Poster + 3 Minute Pitch**

Computer simulation of the geometric pore size and validation with glass bead tests for metal wire meshes

Wednesday, 16 May 2018 16:58 (2 minutes)

Metal wire mesh is used in a wide variety of filtration applications. The geometric pore size is the diameter of the largest spherical bead that can pass through such a mesh. It is a very important quality measure and is found by filtering spherical glass beads with the mesh. Here, we describe how the geometric pore size of a mesh can be reproduced by computer simulations with GeoDict. The simulation works based on 3d voxelized models of the mesh. The 3d models can be obtained in two ways. The first way is taking µCT scans of existing mesh. The second way is creating purely virtual geometric models of next generation metal wire mesh with GeoDict's WeaveGeo module.

The geometric pore size is simulated by tracing spheres through the pores in the model using Saito's fast Euclidean distance transform and Dijkstra's fast marching algorithm. It turns out that the surprisingly good agreement between simulations of the geometric pore size and measurements with glass beads is due to the fortuitious cancellation of two errors in the simulation. In contrast, for a good representation of the center line of the through-pore, one needs to avoid one of these errors.

References

[1] New algorithms for euclidean distance transformation of an n-dimensional digitized picture with applications. T. Saito and J.-I. Toriwaki, Pattern Recognition, Volume 27, Issue 11, 1994, pp. 1551-1565.
[2] A note on two problems in connexion with graphs, EW Dijkstra, Numerische mathematik 1 (1), 1959, pp. 269-271.

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Session Classification: Parallel 8-H

Track Classification: MS 2.15: Modelling and Simulation of Porous Media: From Microstructure to Functionality