

Simulation of nano fibers and filtration processes

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ABSTRACT

Nano filtration media have become increasingly interesting for filtration applications. The benefit of using nano fibers is the improvement with respect to filter efficiency and the relatively low pressure drop due to the nano slip.

At the Fraunhofer ITWM, the simulation of filter media and filtration processes is traditionally performed resolving the smallest scale of the media. When entering the nano regime, two problems arise: First, the structures under consideration become huge in terms of computational grids. Hence, special algorithmic approaches have to be followed to overcome this hurdle. Second, the models for fluid flow and particle movement have to be extended by new physical effects like slip flow.

The presentation gives an overview on the latest developments concerning nano filtration in the Fraunhofer software suite GeoDict / FilterDict.

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Andreas Wiegmann holds a Diplom in Mathematics from the Technical University of Karlsruhe and a PhD in Mathematics from the University of Washington in Seattle. After a couple of years spent jointly at the University of California at Berkeley and the Lawrence Berkeley National Laboratory, he joined the Fraunhofer Institute for Industrial Mathematics at the end of 1999. There he became deputy-head of the department "Flow and Material Simulation" in 2007. For the past decade, Dr. Wiegmann worked on mathematical methods and software for virtual material design, with a strong focus on filter media and filtration processes. He is probably best known for his leading role in the development of Fraunhofer ITWM's GeoDict and FilterDict Software.