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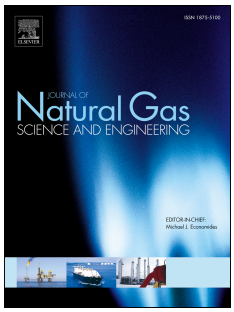

Permeability correlation with porosity and Knudsen number for rarefied gas flow in Sierpinski carpets

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ACCEPTED MANUSCRIPT

Permeability correlation with porosity and Knudsen number for rarefied gas flow in Sierpinski carpets

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Abstract

In recent years, application of porous media is highlighted among researchers due to their wide range of usability in micro-scale problems, such as gas reservoirs, micro-filtering, heat exchangers, etc. With this respect, the accurate description of flow behavior using governing equations based on the continuum assumption is not valid since the mean free path is comparable to the characteristics length of the problem. For this purpose, a simple methodology for diffusion reflection boundary condition is developed and validated for two valuable benchmarks, namely micro-channel flow and fractal porous media, where the results were in good agreement with literature. Then, pore-scale simulation of the rarefied gas flow inside the square- and circular-

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