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Pore size distribution effect on rarefied gas transport in porous media[1] TAKUMA HORI, YUTA YOSHIMOTO, SHU TAKAGI, IKUYA KINEFUCHI, The University of Tokyo — Gas transport phenomena in porous media are known to strongly influence the performance of devices such as gas separation membranes and fuel cells. Knudsen diffusion is a dominant flow regime in these devices since they have nanoscale pores. Many experiments have shown that these porous media have complex structures and pore size distributions; thus, the diffusion coefficient in these media cannot be easily assessed. Previous studies have reported that the characteristic pore diameter of porous media can be defined in light of the pore size distribution; however, tortuosity factor, which is necessary for the evaluation of diffusion coefficient, is still unknown without gas transport measurements or simulations. Thus, the relation between pore size distributions and tortuosity factors is required to obtain the gas transport properties. We perform numerical simulations to prove the relation between them. Porous media are numerically constructed while satisfying given pore size distributions. Then, the mean-square displacement simulation is performed to obtain the tortuosity factors of the constructed porous media..

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