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Numerical Analysis on Energy Accommodation Process of Gas Molecules on Carbon Nanotube Film JUMPEI KAWASAKI, IKUYA KINEFUCHI, SHU TAKAGI, YOICHIRO MATSUMOTO, The University of Tokyo — Because of its large specific surface areas due to its nanoscale structure, film made up with carbon nanotubes (CNTs) is expected to be used as one of the applications for trapping gas molecules and enhancing heat exchange. The relationship between the diffusive movement of gas molecules inside the film and the energy accommodation process, however, has not been clarified yet. In this study, we introduced numerical simulation to analyze the energy accommodation process of gas molecules on CNT film. The film was modeled by piling up cylinders representing CNT bundles. Different scattering models between a CNT and a gas molecule were used to investigate the scattering angle distributions, number of collisions, and intrusion depths of gas molecules that were reflected by and transmitted through the film. The results of calculations well reproduced experimental results. We confirmed that although energy exchange of each collision between single CNT and a gas molecule is small, randomly oriented structure of CNT film induced diffusive movement of gas molecules inside the film, which leads to high accommodation between the film and gas molecules.

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