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Clogging-enhanced fog harvesting on the hole pattern[1] JIHYE PARK, CHANGJE LEE, HYESUNG CHO, MYOUNG-WOON MOON, SANGYOUP LEE, SEONG JIN KIM, Korea Institute of Science and Technology — Clogging has been considered as a drawback in fog-harvesting as it hinders local airflow around a hole. However, in this study, it is demonstrated that the clogging effect on the fog-harvesting performance differs between the stable clogging and the unstable clogging. Unlike the stable clogging that is stably stuck in the hole, the unstable clogging is observed to form and break up repeatedly during the fog-harvesting process. Due to this break-up, fog flow through the unstably-clogged mesh experiences much less pressure drop than that across the stably-clogged mesh even though those meshes have the same shade coefficient. Moreover, it is found that the clogging can be used even for enhancing the fog-capturing efficiency than the clogging-free mesh with the same shade coefficient by increasing the effective shade coefficient to collide with more fog drops, which suggests that the clogging could be not a simple drawback. Rather, especially for the unstable clogging, it can be used to optimize the fog-harvesting performance with maintaining low pressure drop. Moreover, the particle image velocimetry is performed to quantify the increase in the effective shade coefficient of the clogged mesh by measuring the turbulent kinetic energy of the fog flow to the mesh.

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