

Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Reynolds Number Study of Chemical Flow Control using Hydrophobic and Hydrophilic Coatings KATSUAKI MORITA, HIROTAKA SAKAUE, JAXA — A chemical flow control method using functional chemical is discussed. In our previous tests, we showed that separately applied hydrophobic and hydrophilic coatings with six different patterns on an ogive shape model could control the dropping speed by maximum 22 percent at the Reynolds number of $1.0E6$. In the present study, we discuss our chemical flow control method related to the Reynolds number. Because the geometry of the model as well as the water properties is the same in our test case, Reynolds number is directly related to the dropping speed that can be adjusted by the weight of the model. Different orders of magnitude in Reynolds number are investigated. With a given model weight, hydrophobic and hydrophilic coatings are separately applied. We use Fusso51 from Yukawa as hydrophobic coating and WaterX from Nishikinodo as a hydrophilic coating. Contact angles of these coatings are 130 degree and 5 degree, respectively, on anodized aluminum surfaces. A fast frame CCD camera is used to capture the dropping images. Based on the image frame captured, the dropping speeds of various coatings are determined.

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Date submitted: 04 Aug 2008

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