Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Sustainable anti-biofouling and drag reduction of covalent mucilage coatings[1] EUNSEOK SEO, SEONGKWANG HEO, SANG JOON LEE, POSTECH, DEPARTMENT OF MECHANICAL ENGINEERING TEAM — Biofilms contaminate a wide variety of infrastructure elements, systems, and devices. Toxic paints containing biocides provide an effective antifouling tool. However, most of them have been banned internationally because of their unacceptable environmental impacts. To resolve this problem, the development of environmentally friendly coating method is necessary. Inspired by various functions of mucus or mucilage produced by algae and other marine organisms, we developed the multifunctional mucilage coating method with both drag reduction and anti-biofouling effect. In this study, carboxymethyl cellulose (CMC) was coated on the slide glass, and various functional polymers such as mPEG-amine, chitosan, and alginate were covalently attached on the CMC coated surfaces. We measured the slip length of CMC and mPEG coated surfaces with the best anti-biofouling effect. CMC coated surface had no slip effect, while the mPEG-amine coated surface showed slip effect. In this study, we demonstrated that our coating process generates a stable mucilage coating with anti-biofouling and drag reduction properties. The proposed covalent mucilage coating would be available in various industrial fields that require sustainable anti-biofouling and drag reduction.

[1]This study was supported by the National Research Foundation of Korea through a grant funded by the Korean Government (MSIP, No. 2019M3C1B7025088).

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Date submitted: 03 Aug 2020 Electronic form version 1.4