



Article

Supplementary Materials: Fabrication of Zinc Substrate Encapsulated by Fluoropolyurethane and Its Drag-Reduction Enhancement by Chemical Etching

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Figure S1. Synthesis of prepolymer and fluoropolyurethane (a) synthesis of Methyl Fluoro-Aminopropyl Polydimethyl Siloxane (MF-APS), (b) prepolymer produced by polypropylene glycol (PPG) and 2,4-toluene diisocyanate (TDI), (c) prepolymer produced by MF-APS and TDI, and (d) synthesis of prepolymer end capped by an -NCO group.







Figure S2. Waterdrops rolled on Cu^{2+}/HNO_3 -etched zinc + fluoropolyurethane (rolling angle $8 \pm 1.6^\circ$).

Table S1. Uncertainty/error and parameters of non-standard design microchannel.

Parameters of Non-standard Design Microchannel	Set Value (SV)
Microchannel parameter	100 mm × 20 mm × variable h;
and dimensions	jet inlet/outlet: $r = 5 \text{ mm}$, $h = 10 \text{ mm}$
Volume flow rate	1×10^{-5} to 7×10^{-5} m ³ /s
Static pressure	0–2.5MPa
Fluids property	DI water: $\varrho = 998.2 \text{ kg/m}^3$, viscosity 1.00 mPa·s;
Analogy method	Finite volume method
Solution method	Pressure-cased solver
Algorithm	PISO
Inlet condition	Velocity-inlet
Outlet condition	Free discharge
Test suface	(a) Unetched zinc substrate,
	(b) Unetched zinc + fluoropolyurethane,
	(c) Cu ²⁺ / HNO ₃ etched zinc, and
	(d) Cu ²⁺ / HNO ₃ etched zinc + fluoropolyurethane



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