Effect of Surface Cleaning on Performance of Organic Friction Modifiers

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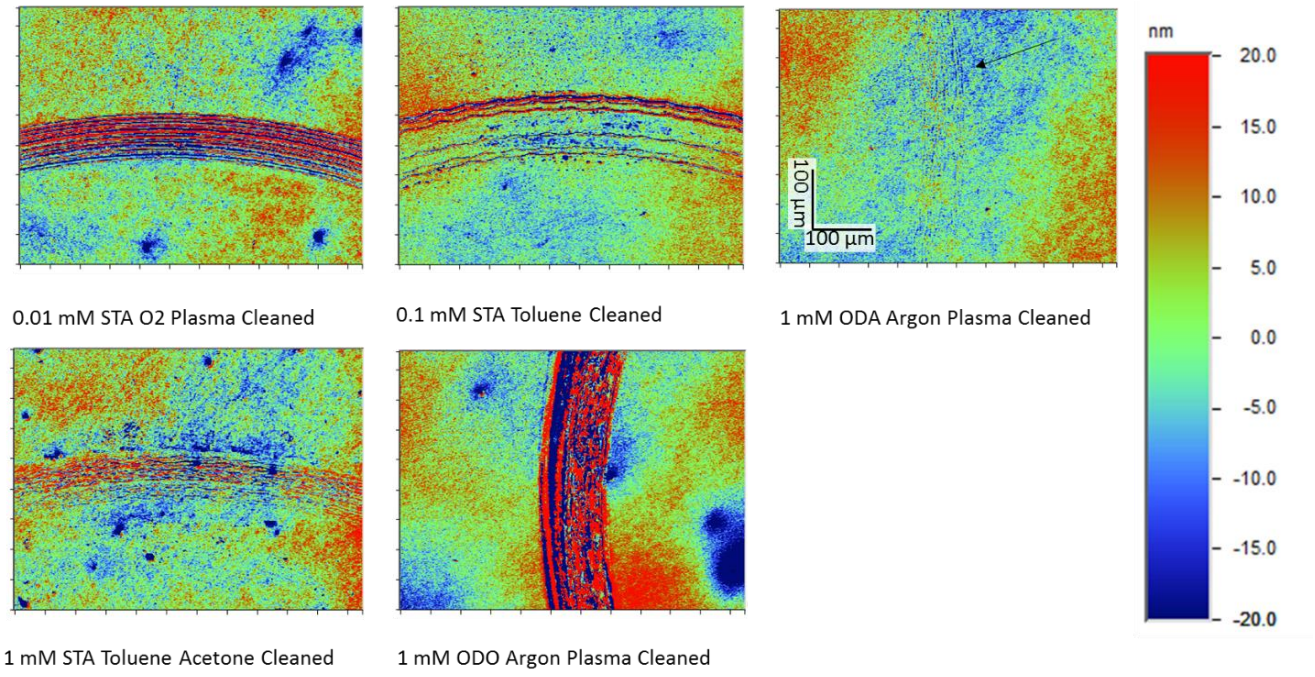
SUPPLEMENTARY DATA

S1: The thicknesses of the layers on the steel disk measured through fitting of the spectroscopic ellipsometry data.

Layer Thickness (nm)	No Cleaning	Acetone	Toluene Acetone	Toluene	Oxygen Plasma	Argon Plasma
Contamination	2.9 - 6.1	2.3 - 2.5	3.6 - 3.7	0.7 - 3.7	0.0 - 1.0	0.0 – 1.0
Effective medium	5.7- 8.3	8.0 – 8.3	7.9 - 8.3	5.2 - 6.3	6.0 – 6.8	4.5 - 7.3
Oxide	0.0 -1.4	0.0 – 0.3	0.0 – 0.4	0.0 – 1.8	0.0 – 1.3	0.0 - 0.5

Steel oxide refractive index (RI) is based on the RI of Haematite (1). The oxide layer is characterised by 2 Lorentz fittings (Fq = 3.937, St = 50.000, DP = 2.297 and Fq = 0.000, St = 0.260, Dp = 0.131), Steel base layer is characterised by 3 Lorentz fittings (Fq = 2.639, St = 26.804, DP = 1.765; Fq = 1.696, St = 318.687, DP = 7.139 and Fq = 0.652, St = 19.222, Dp = 0.000) and the contamination refractive index is modelled as a constant RI of 1.5. The effective medium was modelled as a Bruggemann effective medium containing 50% oxide and 50% contamination.

S2: Representative WLI images of the wear track on the disk for the 5 different OFM additives tested.



REFERENCES

(1) M.L. Miranda-Medina, S. Spiller, A. Vernes and M. Jech, "Spectroscopic ellipsometry and X-ray photoelectron comparative studies of tribofilms formed on cast iron surfaces," Tribol. Int. 113 (2017), pp. 101–110.