Supporting Information

Robust Superhydrophobic Membrane for Solving Water-Accelerated Fatigue of ZDDP-Containing Lubricating Oil

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Figure S1. Water contact angles of original (a), SiO_2-AP-coated (b), and SiO_2-AP-FOTS-coated (c) SSMs.

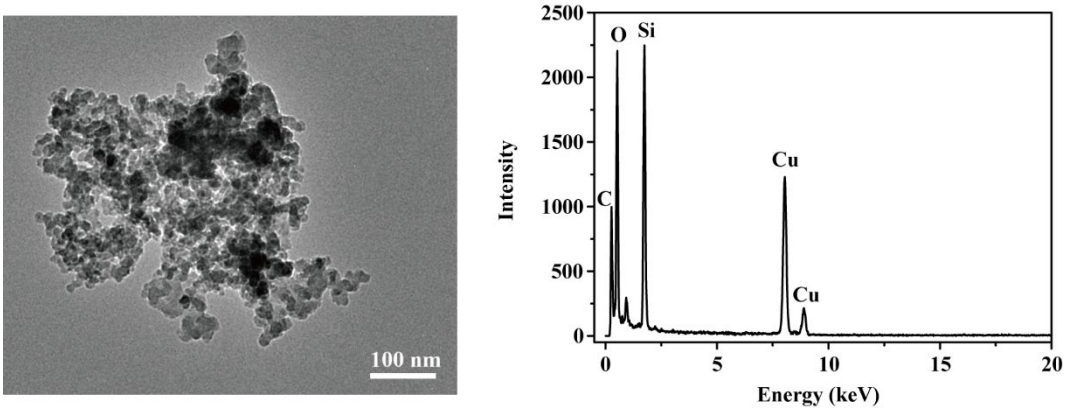

Figure S2. TEM image and EDS spectrum of SiO_2 nanoparticles.

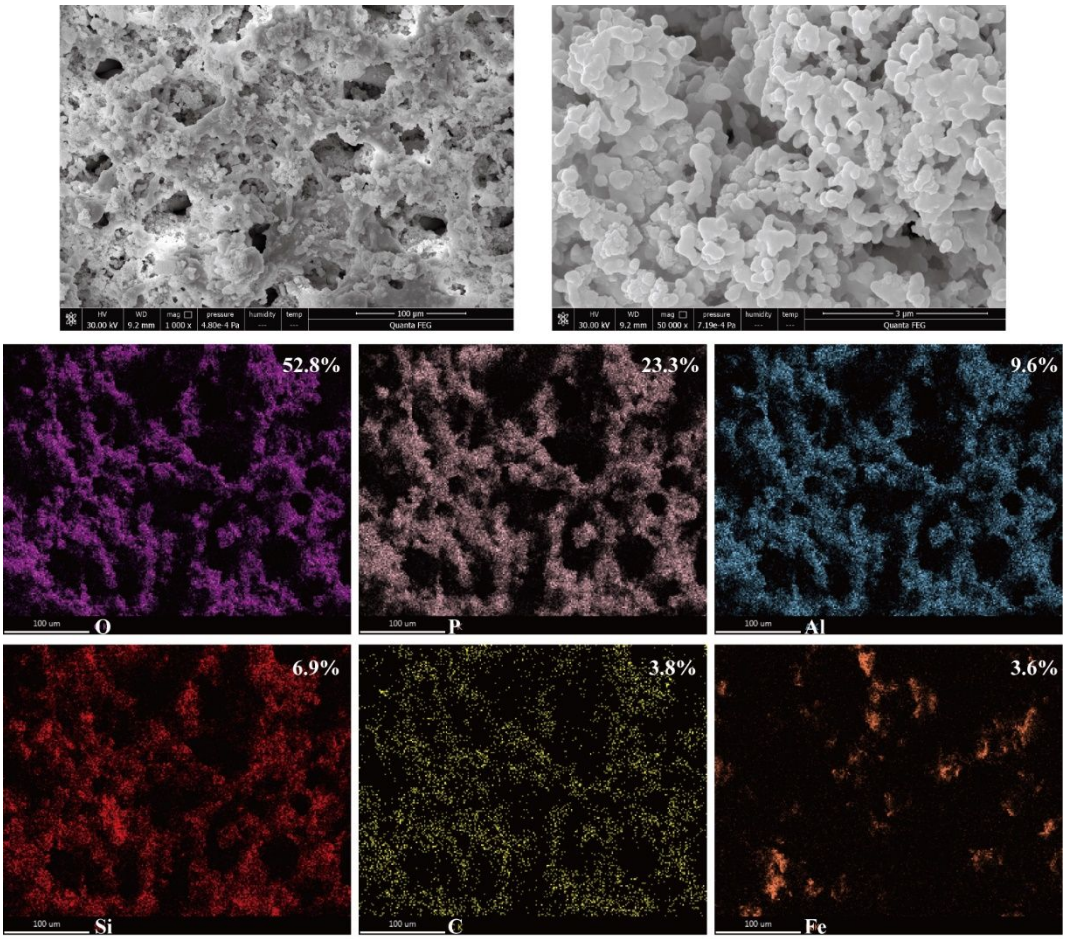

Figure S3. SEM images and element distribution maps of the SiO_2-AP-coated SSM.

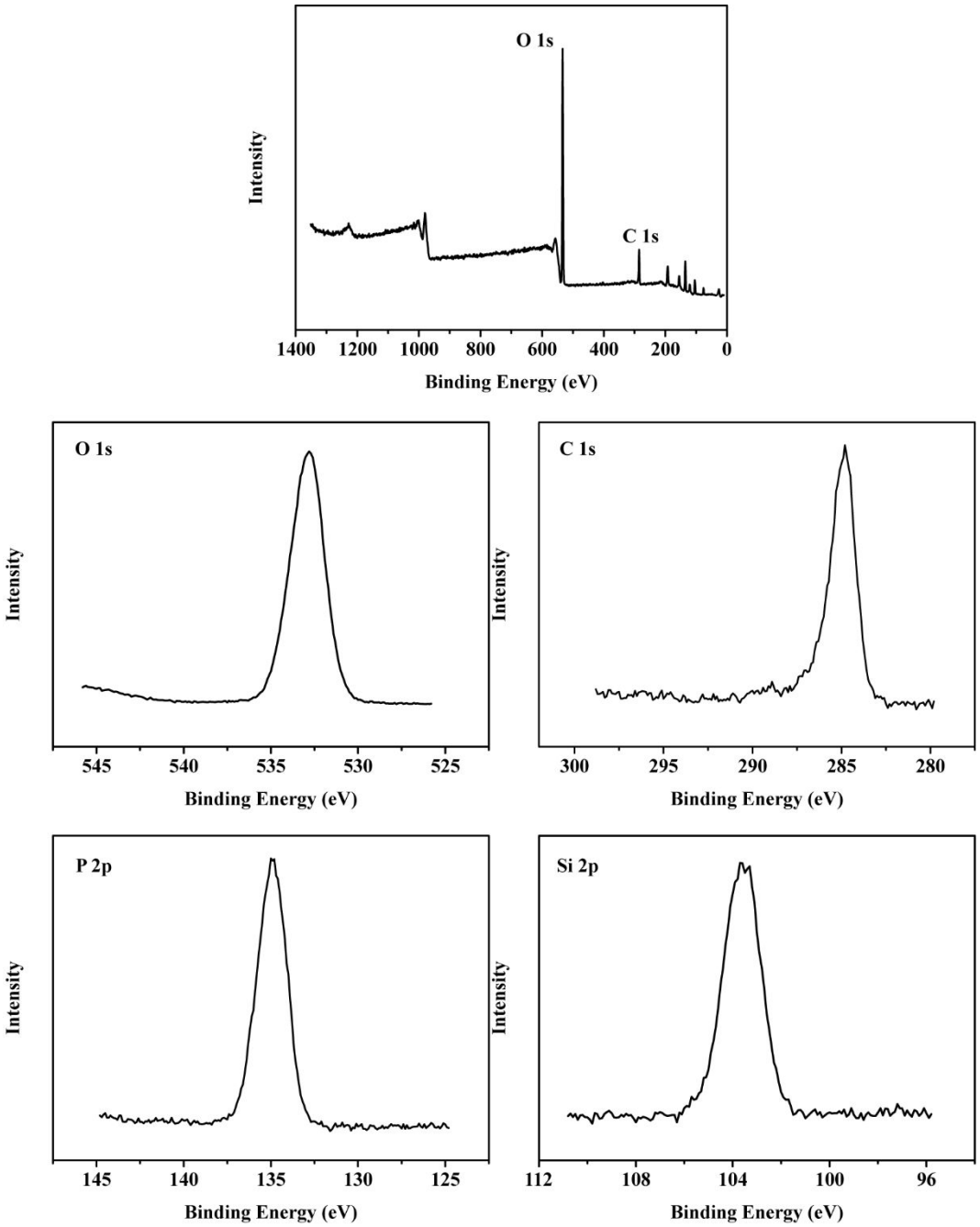

Figure S4. XPS spectra of the SiO_2-AP-coated SSM.

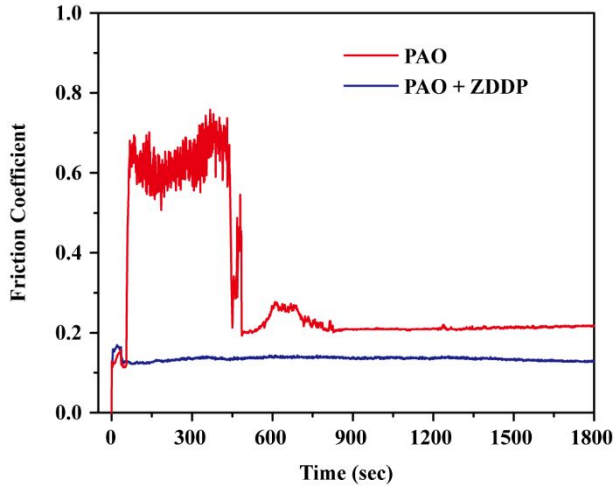

Figure S5. Friction coefficient of the test pair in PAO oil without and with ZDDP.

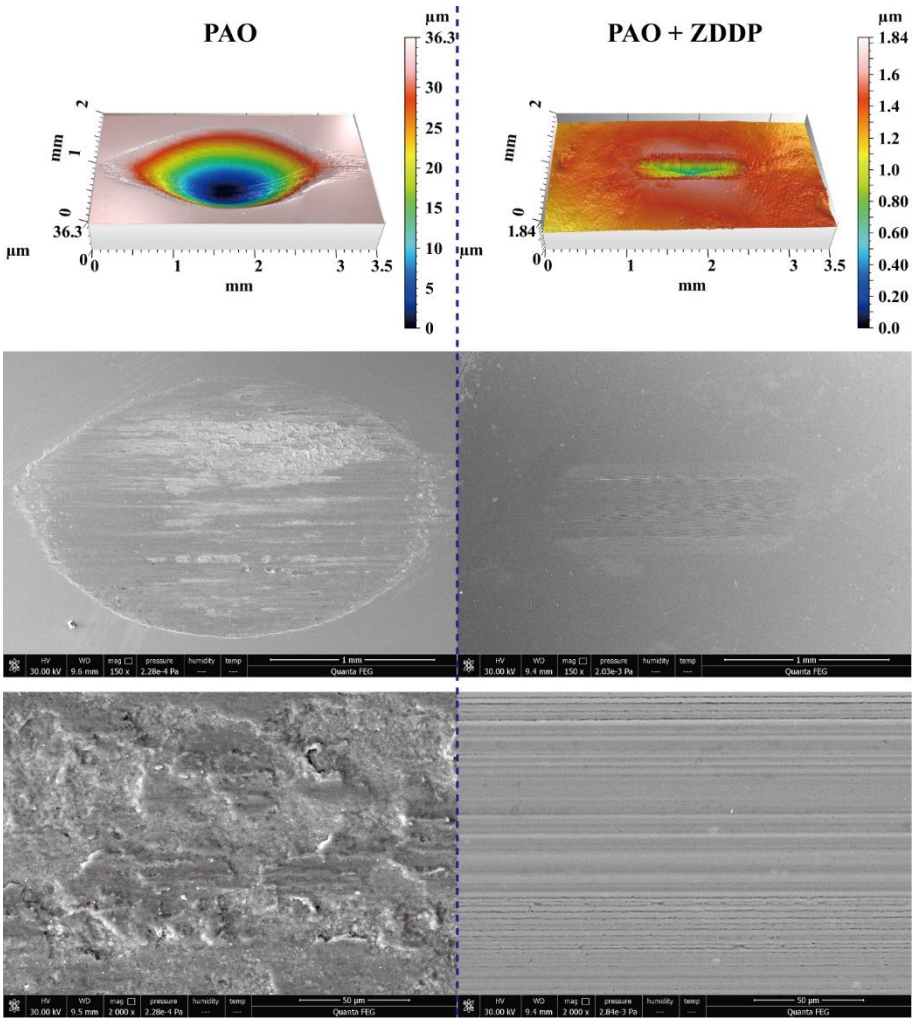

Figure S6. 3D optical microscopic images and SEM images of wear scars after the tribological tests in PAO oil without and with ZDDP.

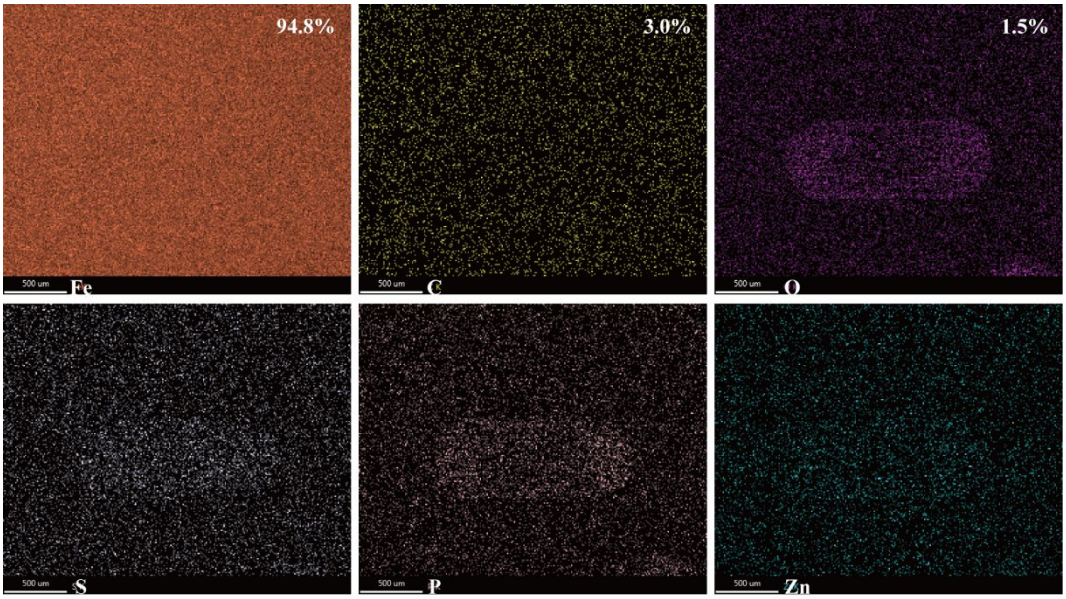

Figure S7. Element distribution maps of wear scars after the tribological test in ZDDP-containing PAO oil without water.

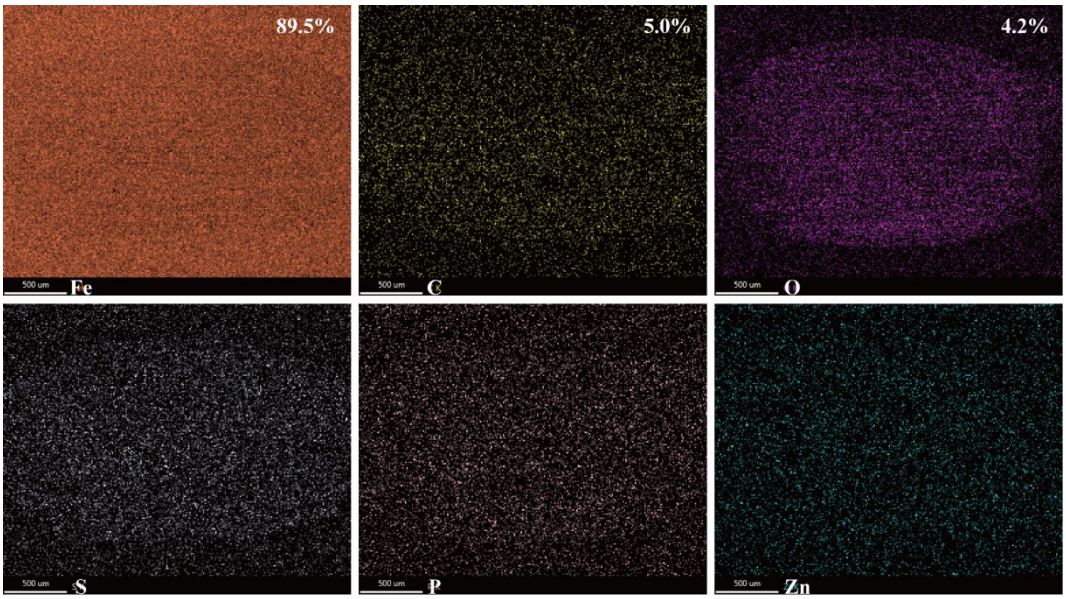

Figure S8. Element distribution maps of wear scars after the tribological test in ZDDP-containing PAO oil with 1/200 water.

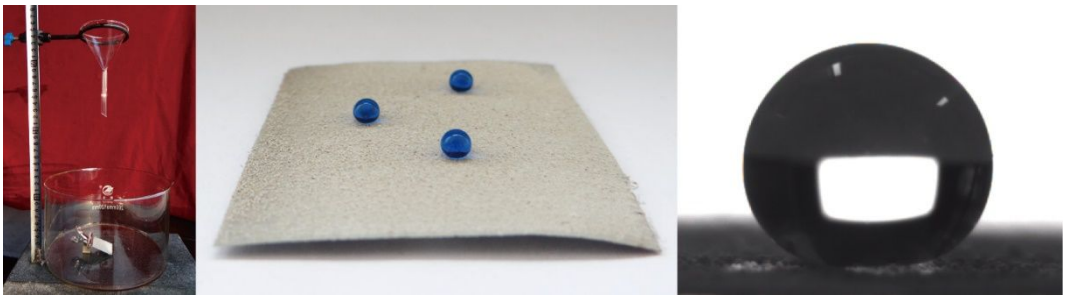

Figure S9. Homemade equipment for the sand impingement test and photographs of water droplets (dyed blue) on the SiO_2-AP-FOTS-coated SSM after the sand impingement for 100 cycles.

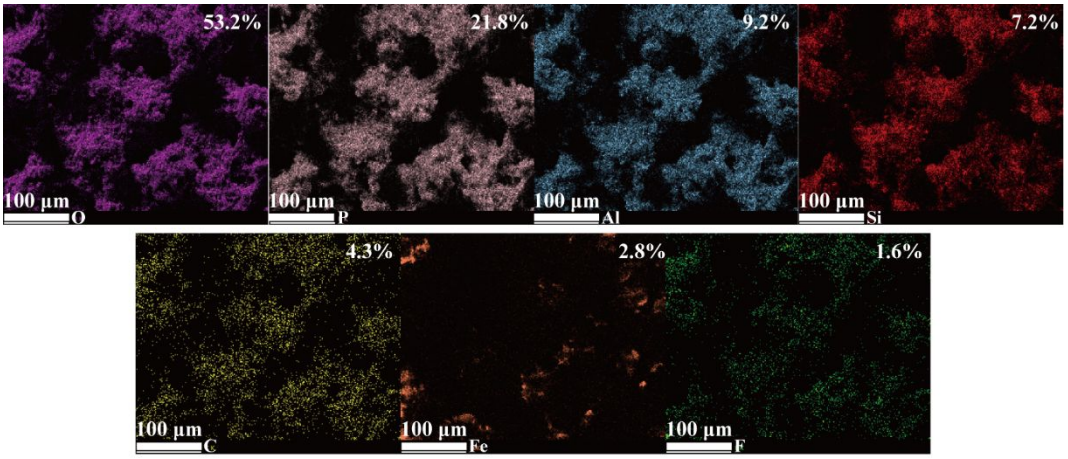

Figure S10. Element distribution maps of the SiO_2-AP-FOTS-coated SSM after the sand impingement for 100 cycles.

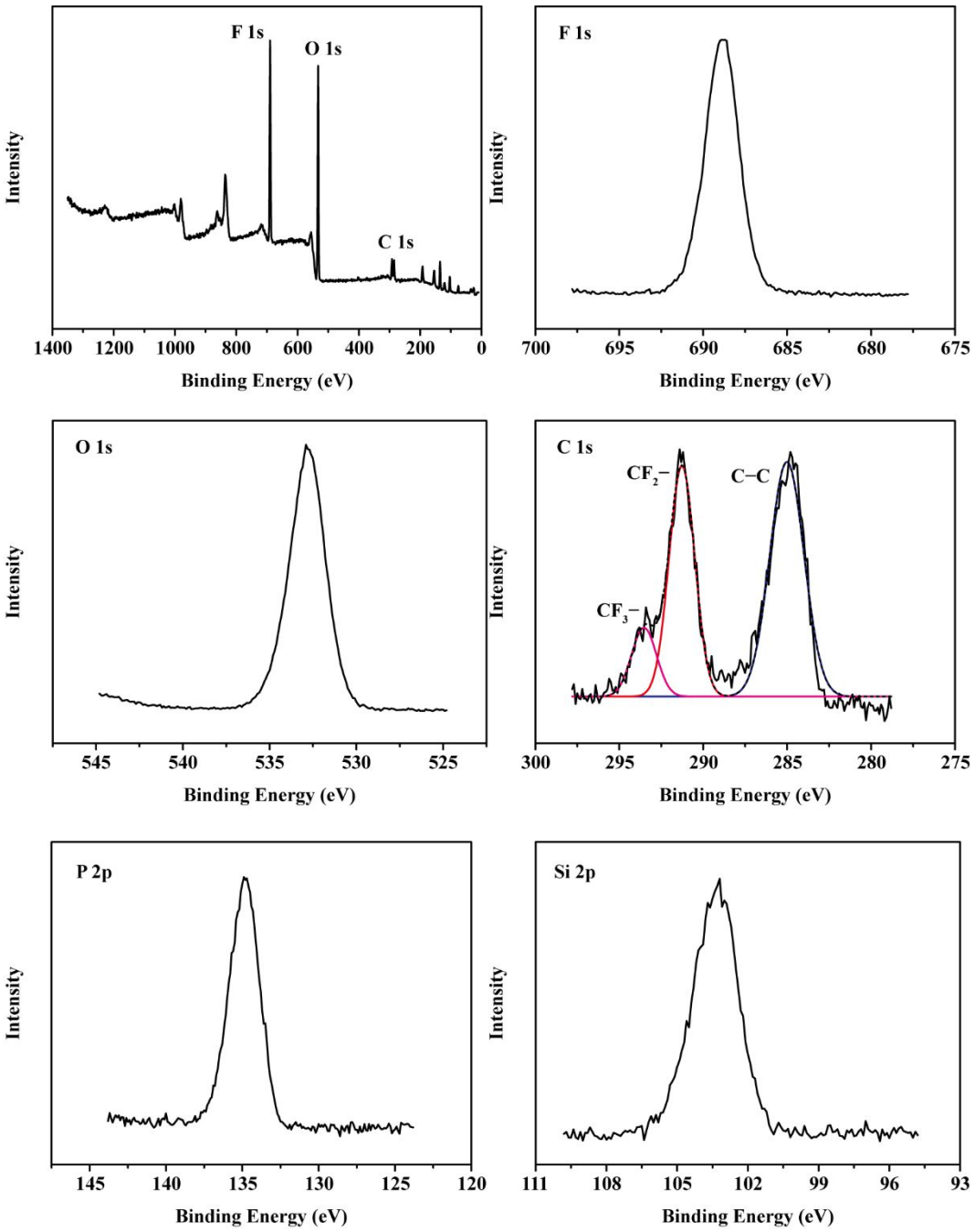

Figure S11. XPS spectra of the SiO_2-AP-FOTS-coated SSM after the sand impingement for 100 cycles.

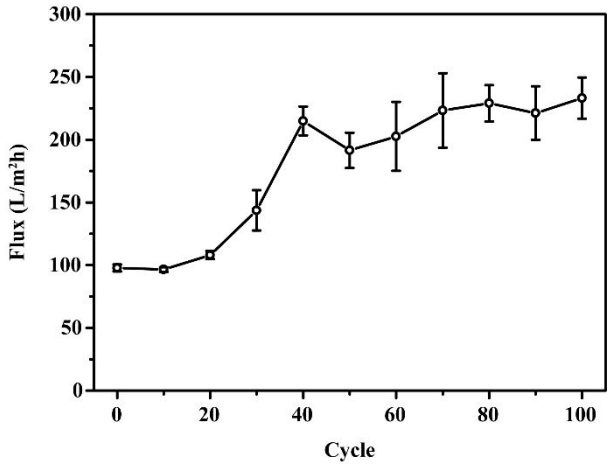

Figure S12. Change on flux of ZDDP-stabilized water-in-PAO oil (1/200) emulsion using the treated SiO_2-AP-FOTS-coated SSM with impingement cycles.

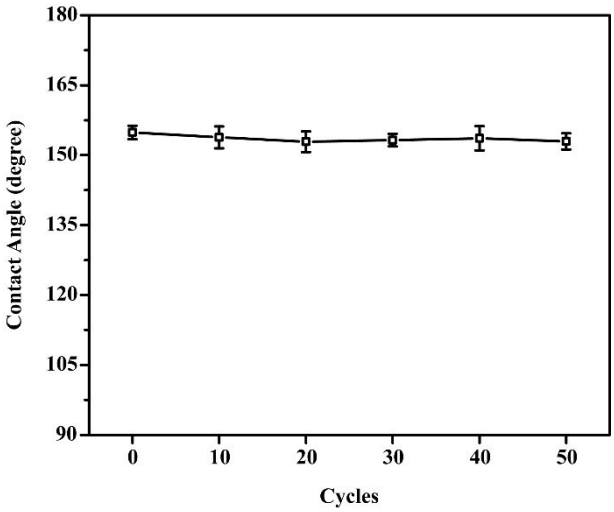

Figure S13. Change on contact angle of the SiO_2-AP-FOTS-coated SSM after immersing in PAO oil for 24 h with impingement cycles.

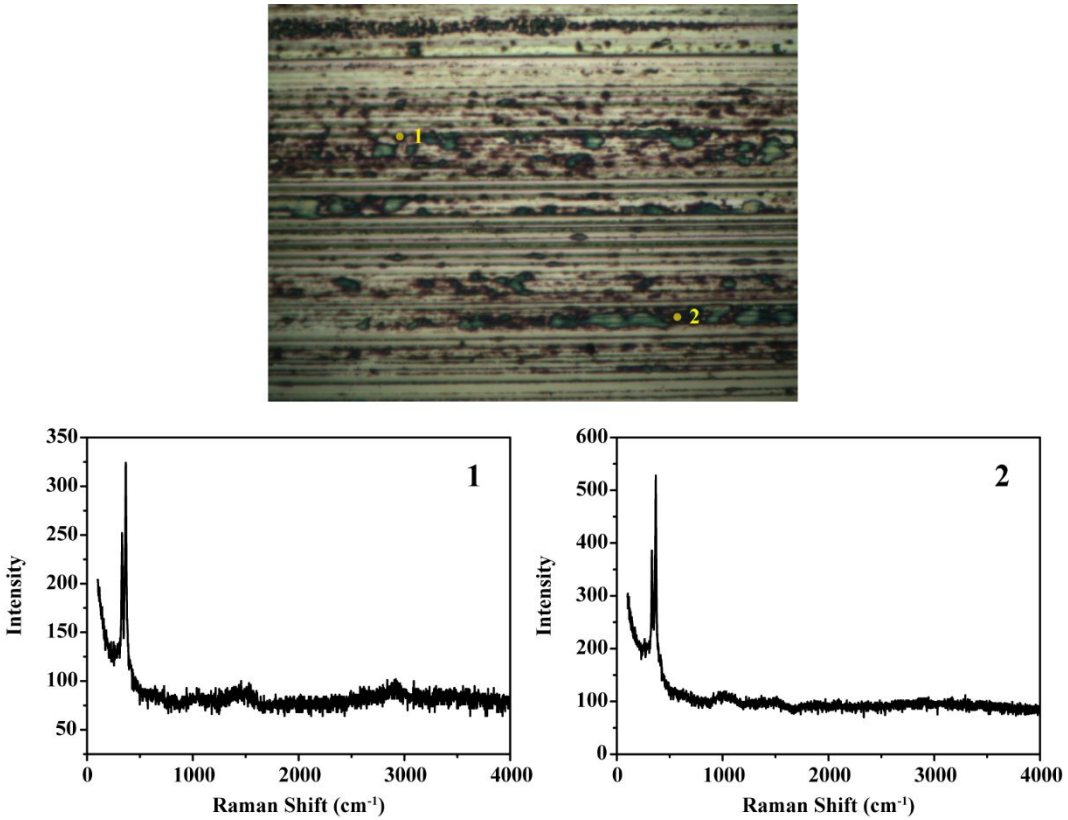

Figure S14. Optical image of wear scar after the tribological test in ZDDP-containing PAO oil without water and the corresponding Raman spectra at different points.

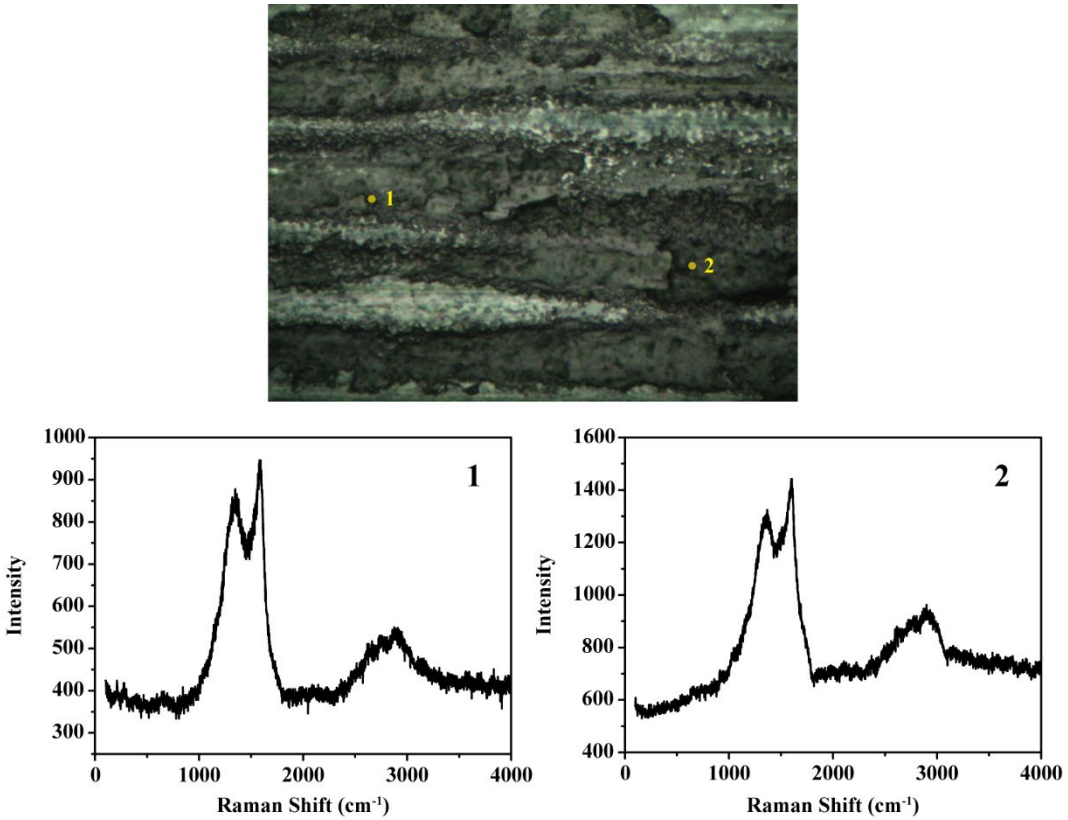

Figure S15. Optical image of wear scar after the tribological test in ZDDP-containing PAO oil with 1/200 water and the corresponding Raman spectra at different points.