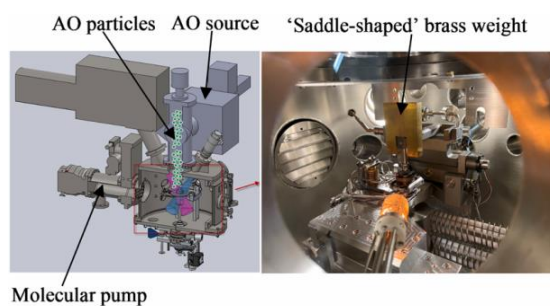
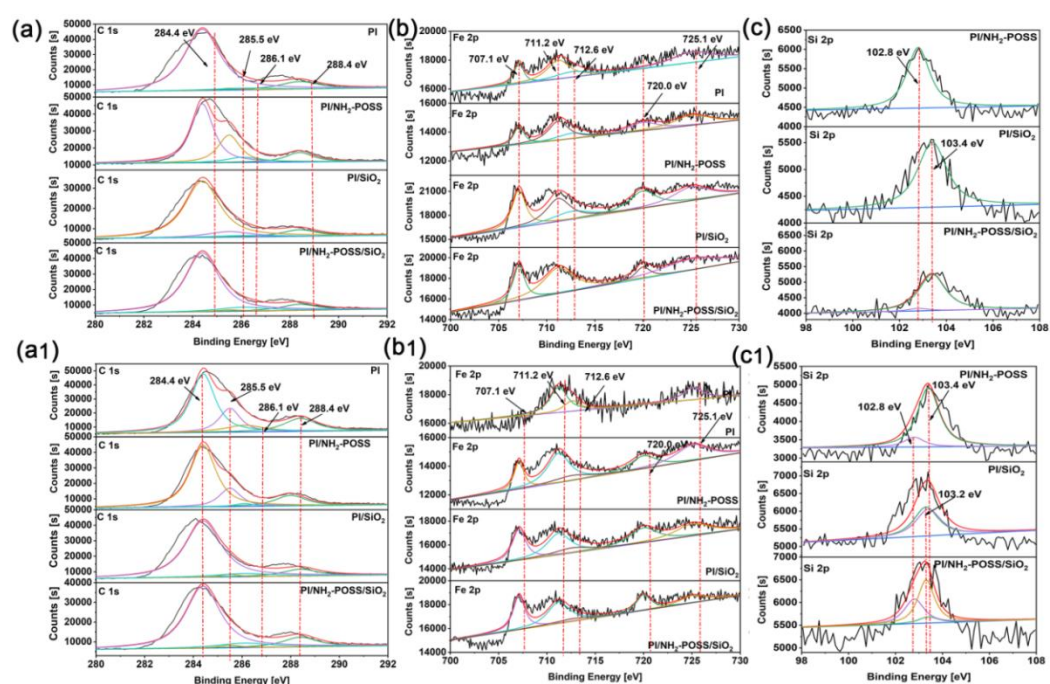


## Supporting Information



**Figure S1.** The schematic of vacuum tribometer equipped with in-situ AO irradiation.



**Figure S2.** XPS spectra of (a) and (a1) C 1s, (b) and (b1) Fe 2p, and (c) and (c1) Si 2p of the counterpart surfaces after sliding against PI, PI/NH<sub>2</sub>-POSS, PI/SiO<sub>2</sub> and PI/NH<sub>2</sub>-POSS/SiO<sub>2</sub> in air and vacuum atomic oxygen environment, respectively.