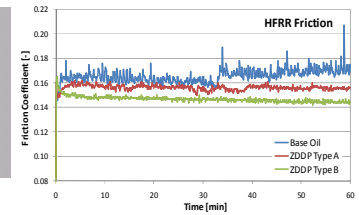
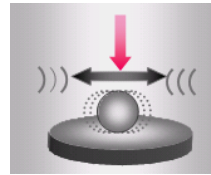
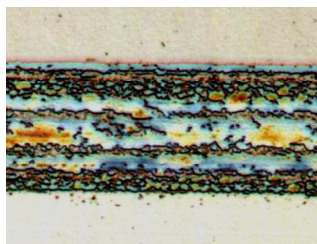


AFM Characterization of Two ZDDP AW Film Surfaces

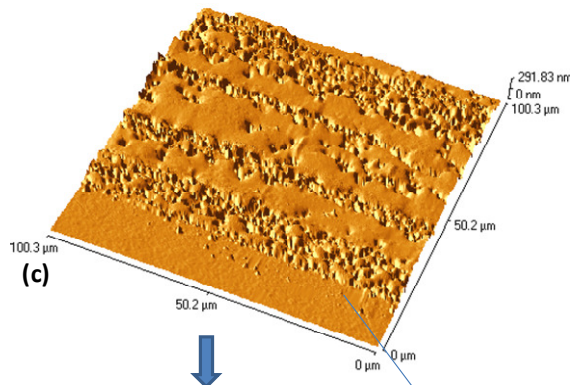
Two fluids, containing two different types of ZDDP lubricant additive are tested in a rubbing test using a HFRR (High-Frequency-Reciprocating-Rig, *PCS Instruments*) test rig. After the rubbing, the disc wear tracks are examined using the AFM (Atomic-Force-Microscopy). AFM topography images reveal rather thick antiwear films, which however defer significant in surface roughness and topography, depending on the type of the ZDDP additive.



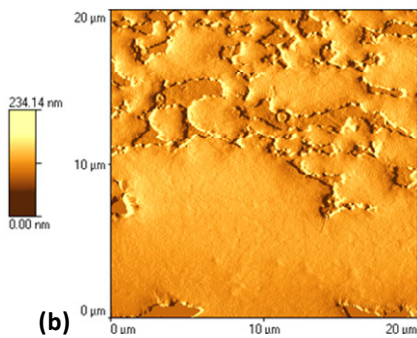
ZDDP Type A



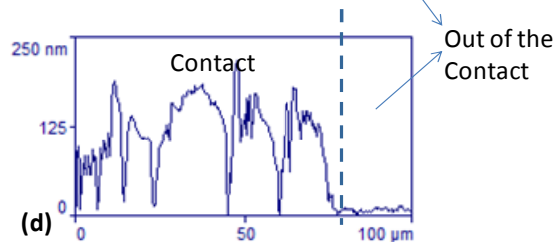
(a)



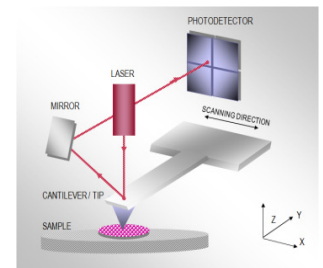
(c)



(b)



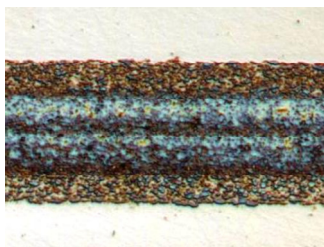
(d)



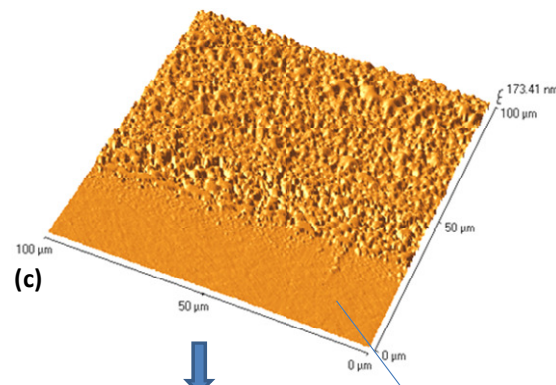
AFM Topography

- (a) Microscopy image of the disc wear track
- (b) AFM topography image of the centre of the wear track, 2D
- (c) AFM topography image of the area crossing the edge of the wear track, 3D
- (d) AFM line profile taken across the edge of the wear track, revealing antiwear film thickness and profile

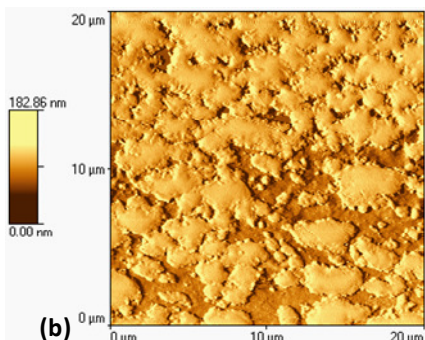
ZDDP Type B



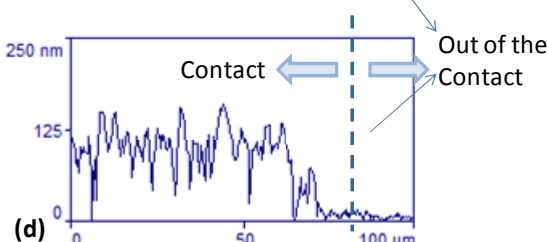
(a)



(c)



(b)



(d)

