

## Supplementary Information



Figure 1: Left: Evolution of the rugosity as a function of the Oscillation Period T. Right: AFM of a coupled selected samples.

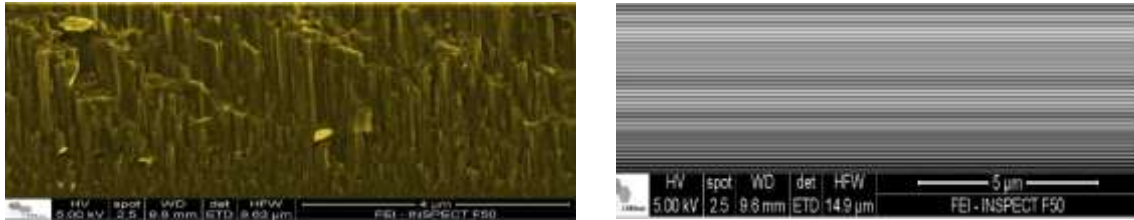


Figure 2. Top, left: SEM columnar micrograph, stationary sample; Top, right: 2D-FFT from sample obtained with period T=6.2 min. Bottom: Vertical profile of the 2D-FFT.

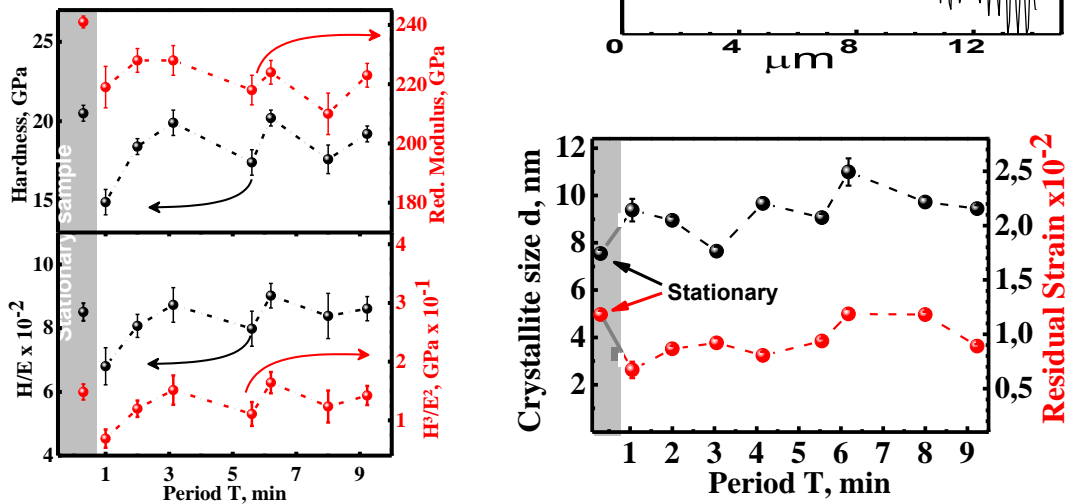


Figure 3: Left: Top: Hardness and Reduced Modulus vs. Period T; Bottom: Behavior of the plasticity and elastic parameters as a function of the Period T. Right: Crystallite size (strain) vs. Period T, obtained from the XRD diffractograms (not shown) using the line analysis (T.H. de Keijser et al., J. Appl. Crystallogr. 15 (1982), 308)

The above plots show the effect of the oscillatory behavior on the physical properties of the material. A simulation software of metal transport (SiMTra), consisting in a binary collision Monte Carlo program was employed to calculate the transport of ejected particles through the gas phase during sputtering. With this information, the peculiar results of the parameters reported above were modeled.