

Fig. 1. Selected GIXRD patterns of Cr-Hf-O films deposited with different cycle ratio of $m (\text{Cr}(\text{thd})_3\text{-O}_3) + (\text{HfCl}_4\text{-O}_3)$ resulting in films with different chemical compositions.

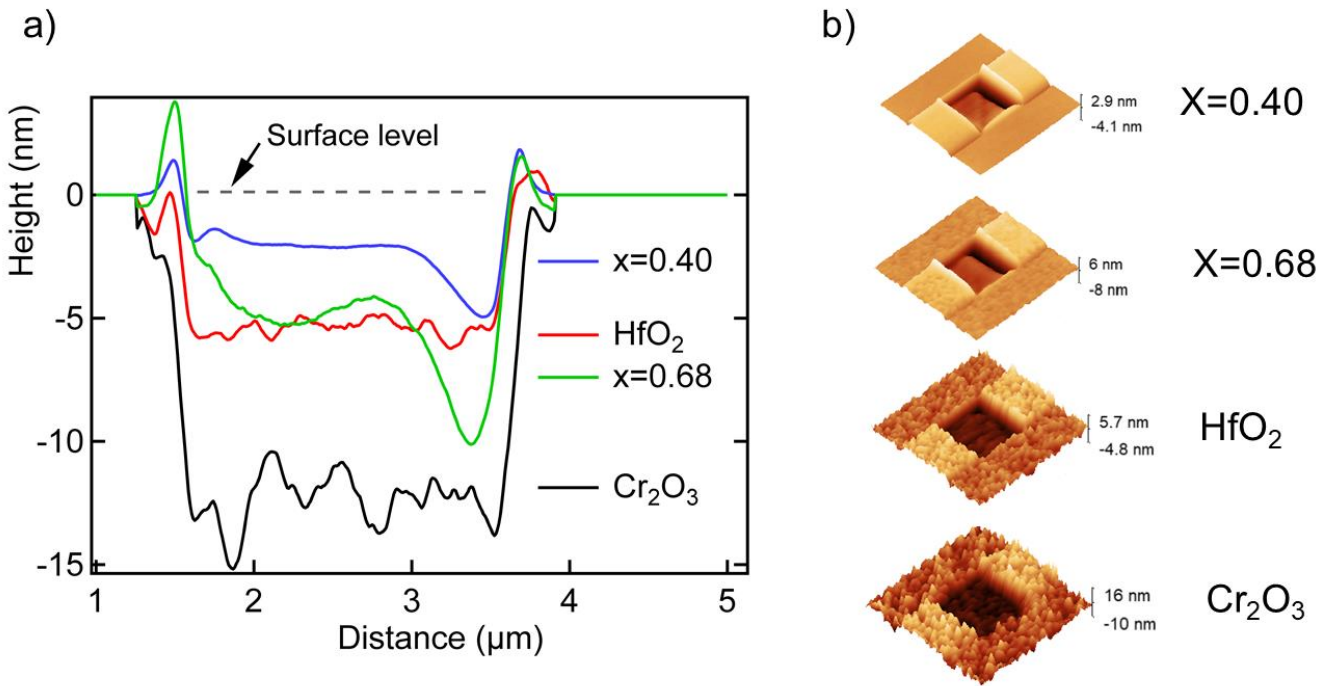


Fig. 2. a) averaged wear profile and b) post-wear scanning probe microscope images of the Cr_2O_3 , HfO_2 and some selected Cr-Hf-O films ($x = \text{Hf}/(\text{Hf} + \text{Cr})$) under the load of $120 \mu\text{N}$ and wear track area of $2 \times 2 \mu\text{m}^2$. The averaging of profiles was calculated over 200 profiles at different areas on each sample.