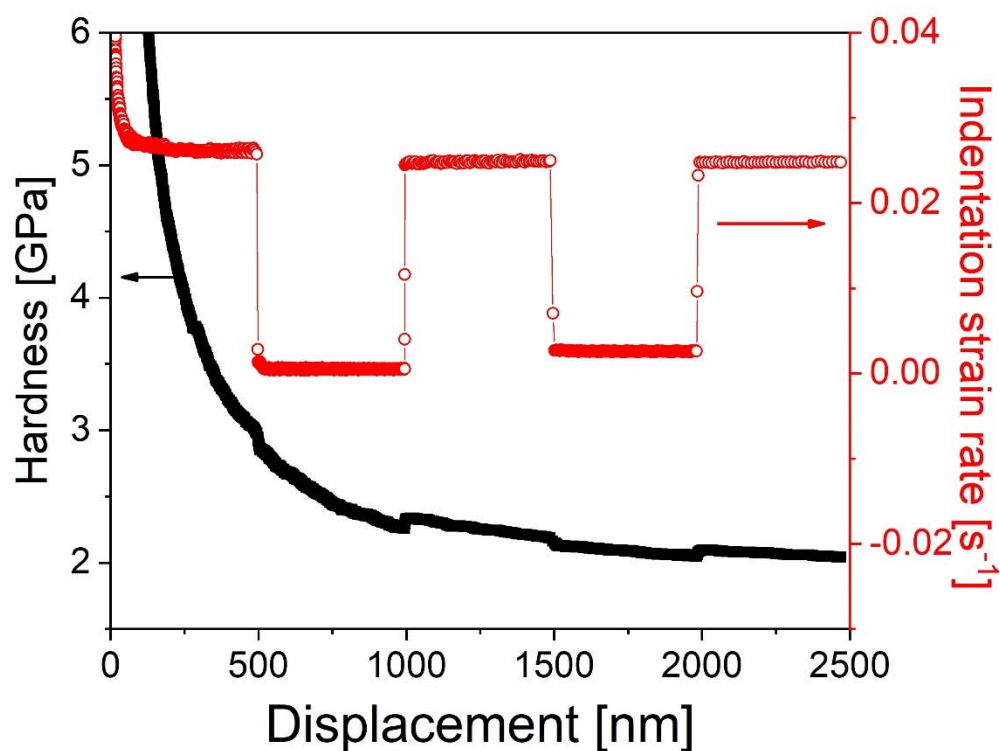
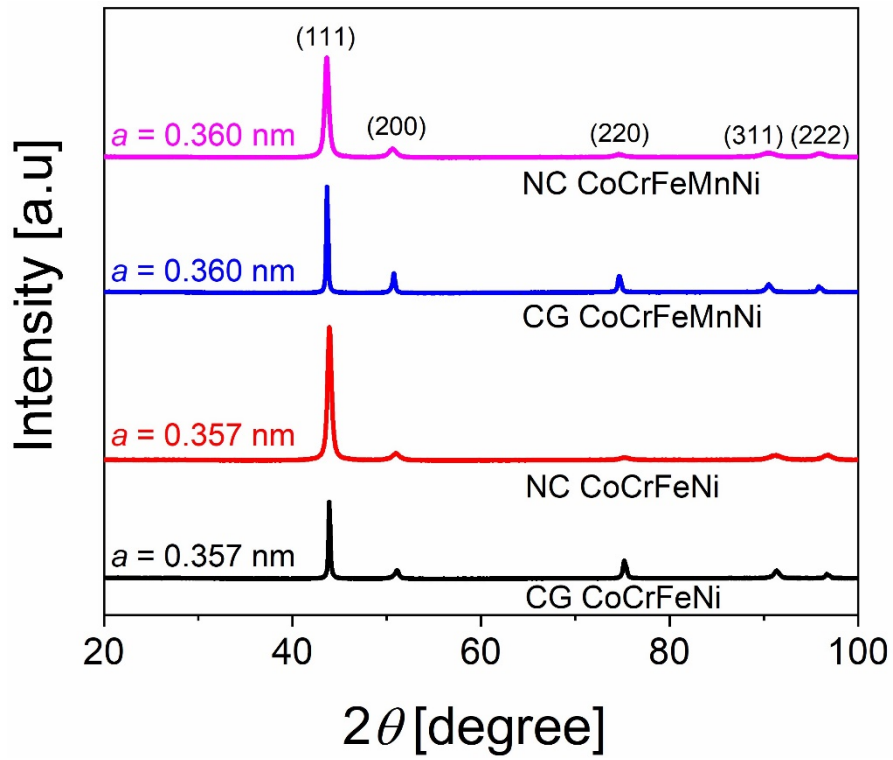


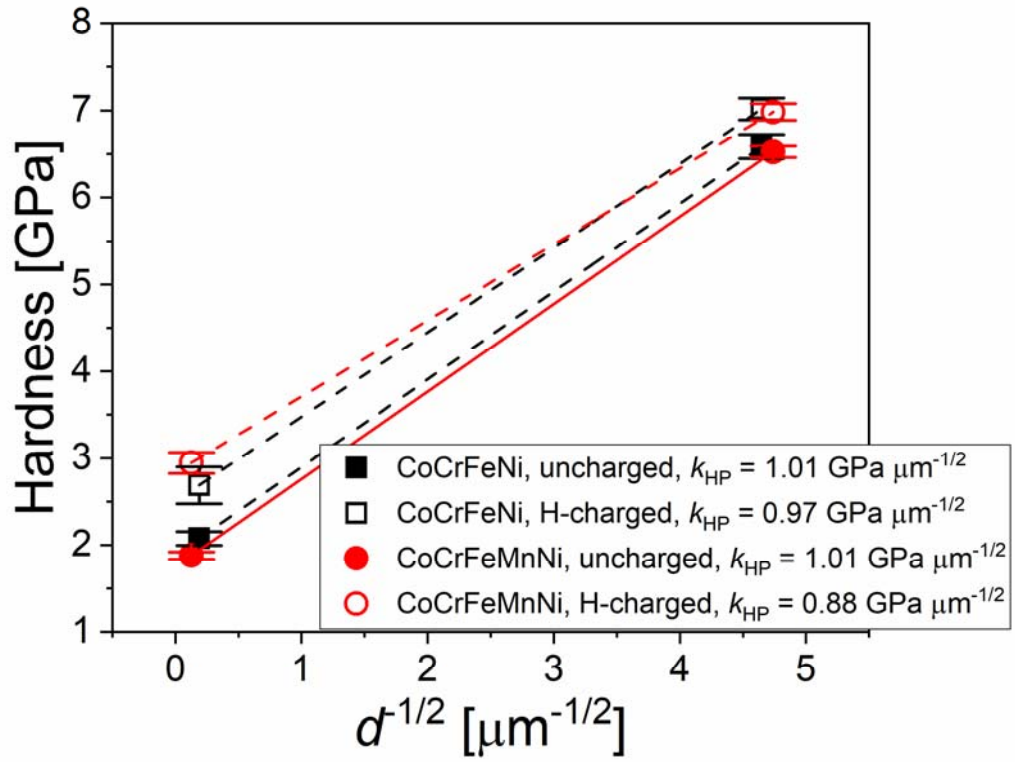
## Supplementary information



**Figure S1** A representative illustration of nanoindentation strain-rate jump test (for CG CoCrFeMnNi sample). Because of the relatively large effect of indentation size effect on the hardness at shallow depths, especially in the CG samples, the hardness values caused by strain rate change at 500 nm depth was not considered in calculating the strain-rate sensitivity and activation volume.



**Figure S2** X-ray diffraction (XRD) results suggesting single fcc phase in all the samples. The values of lattice parameter,  $a$ , obtained is also provided for each sample.



**Figure S3** Estimations of Hall-Petch coefficient,  $k_{\text{HP}}$ , in the CoCrFeNi and CoCrFeMnNi HEAs with and without hydrogen charging.