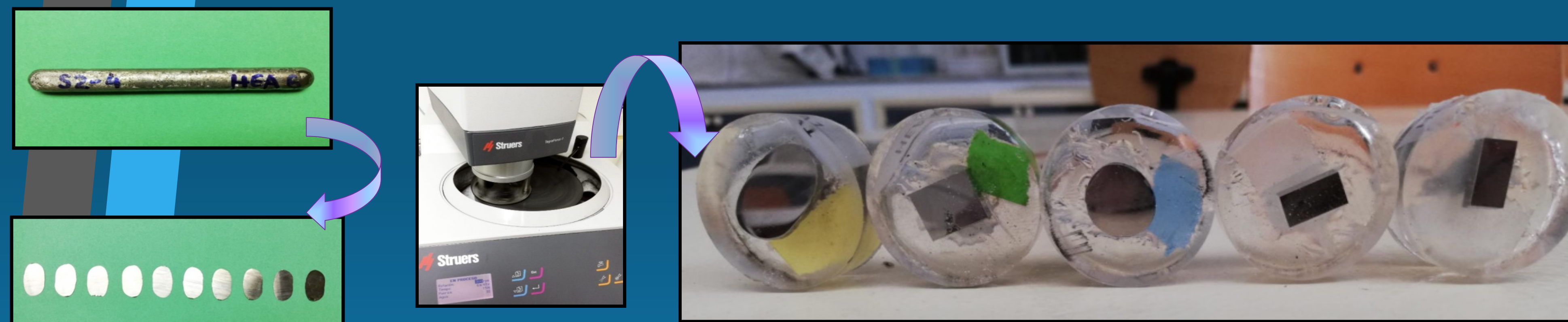
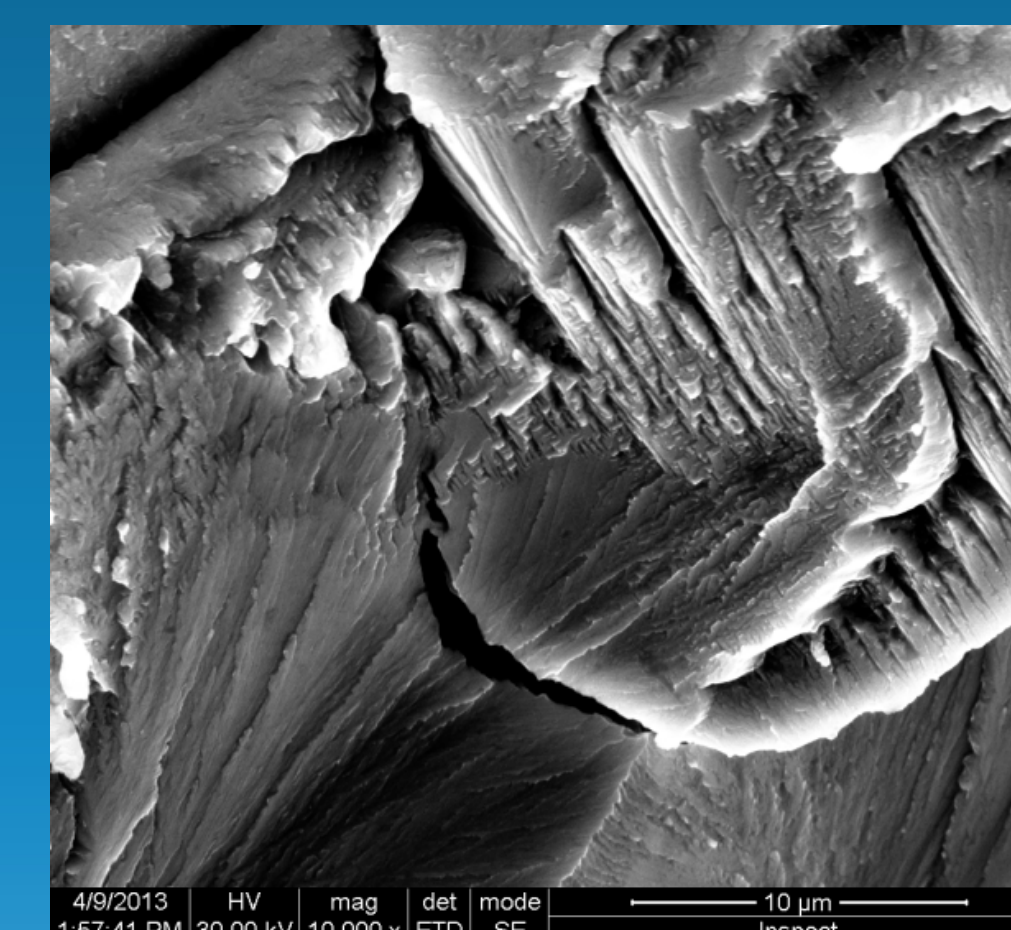


SPECIMENS PREPARATION



COMPONENTS	HEA 1	HEA 5	HEA 6	HEA 12	HEA 14
	AlCrFeCoNi	Al _{0.8} CrFeCoNi	Al _{0.6} CrFeCoNi	AlCrFeCoNi _{1.4}	AlCrFeCoNi _{1.8}
Al, wt%	10,67	8,72	6,68	9,76	8,99
Cr, wt%	20,55	21,00	21,47	18,8	17,32
Fe, wt%	22,13	22,61	23,12	20,24	18,65
Co, wt%	23,32	23,82	24,36	21,33	19,65
Ni, wt%	23,33	23,85	24,36	29,86	35,38

The pioneering efforts in obtaining the high entropy alloys (HEAs) created the groundwork for a new concept of solid solutions multi-principal element alloys with unique properties at the nanoscale. In this study we investigate the effect of different nickel concentration on the microstructure, hardness and corrosion properties of high entropy alloys from AlCrFeCoNi system.

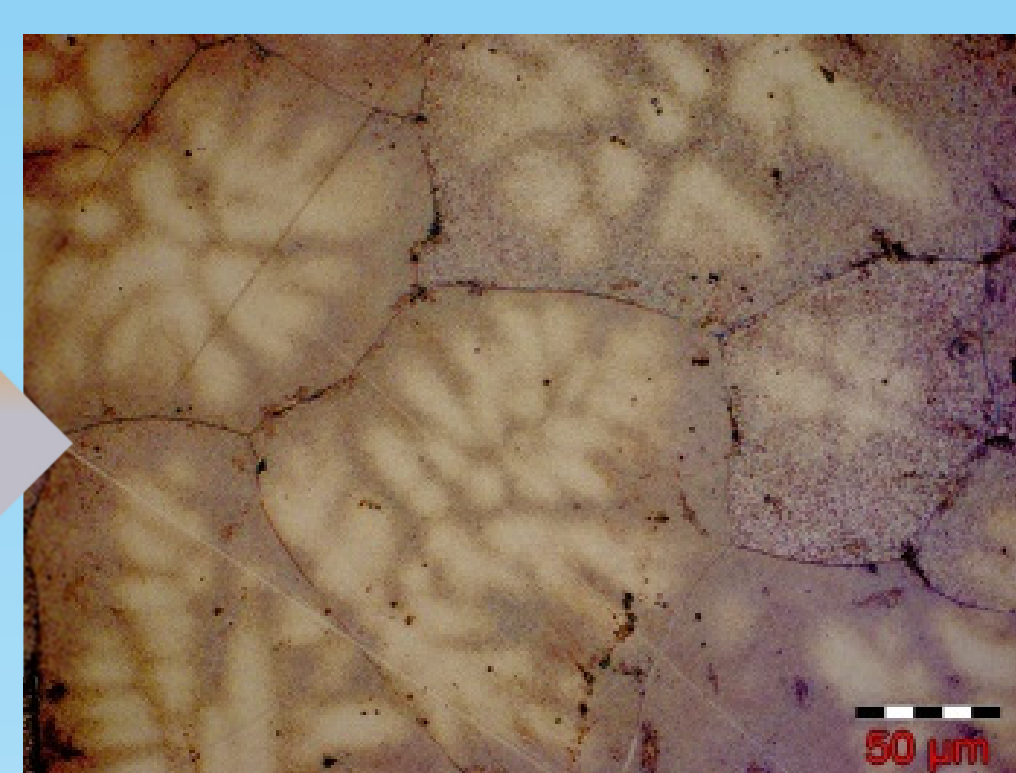


Nanometric image of HEA1 surface after fracture (Scanning Electron Microscope)

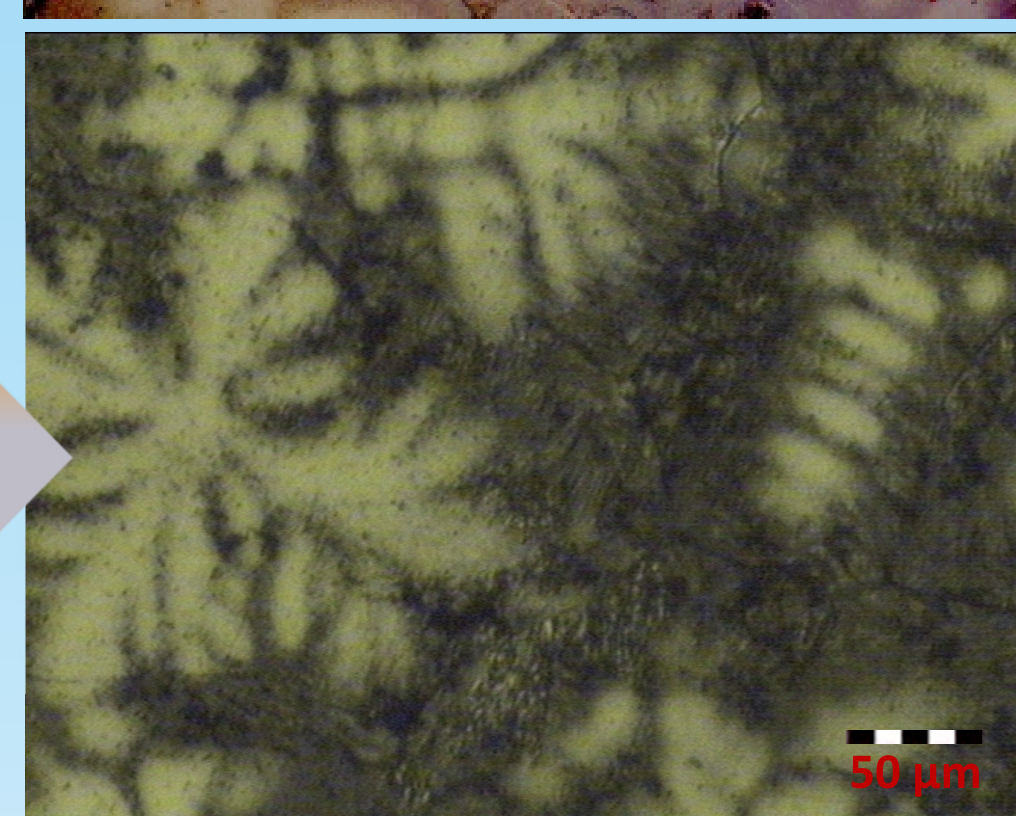
TESTS AND RESULTS



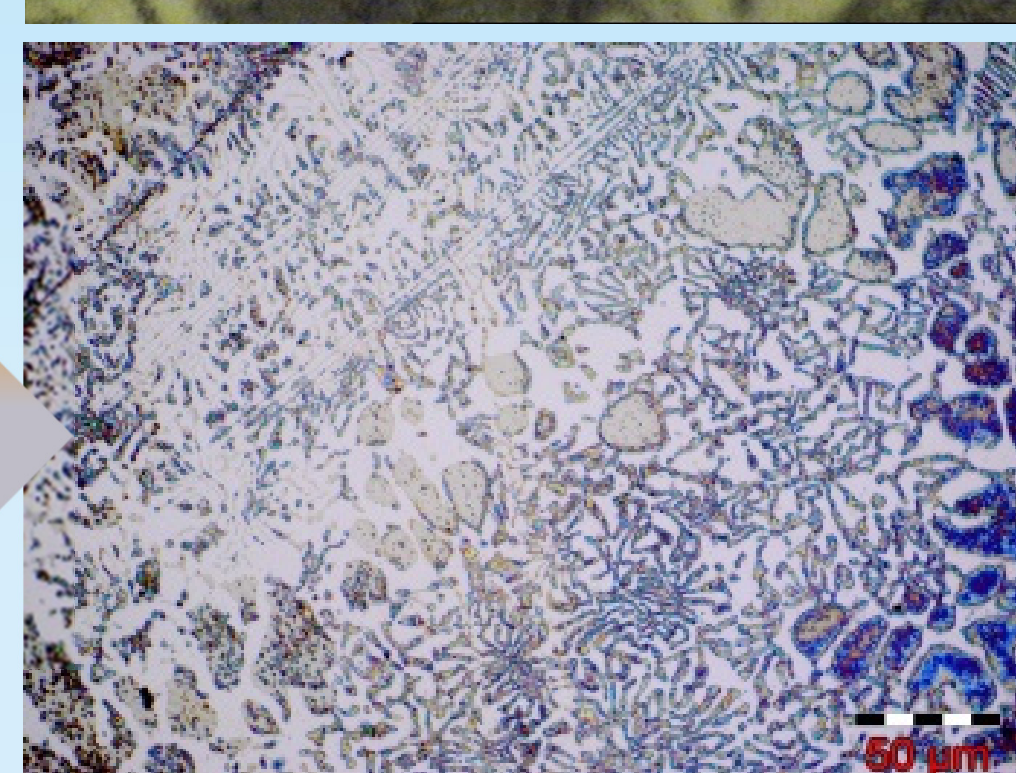
METALLOGRAPHY



HEA1

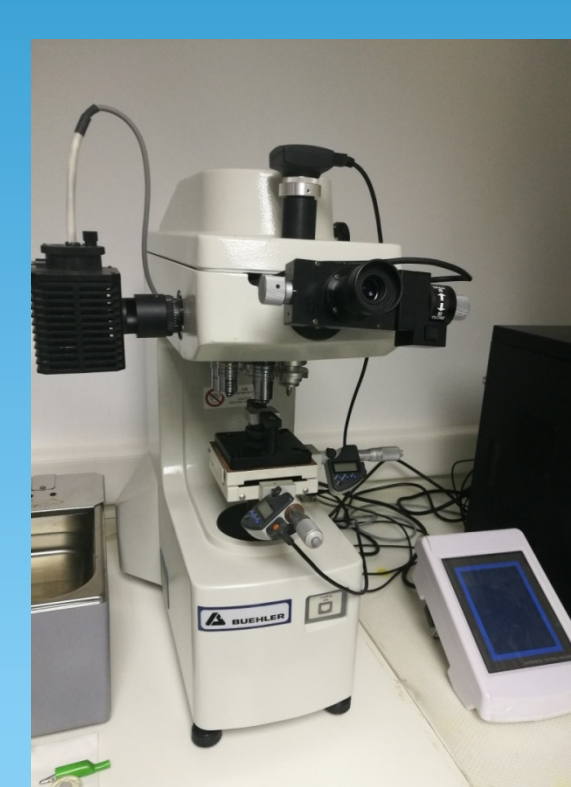


HEA12

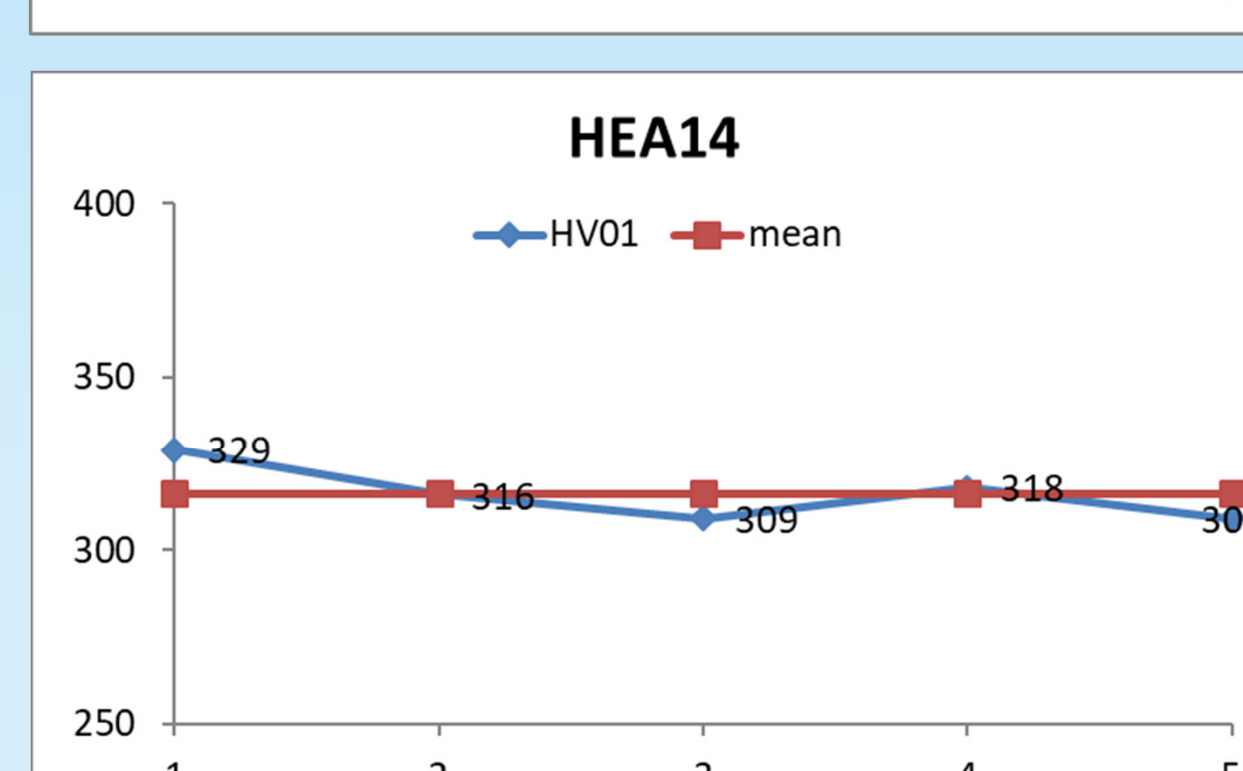
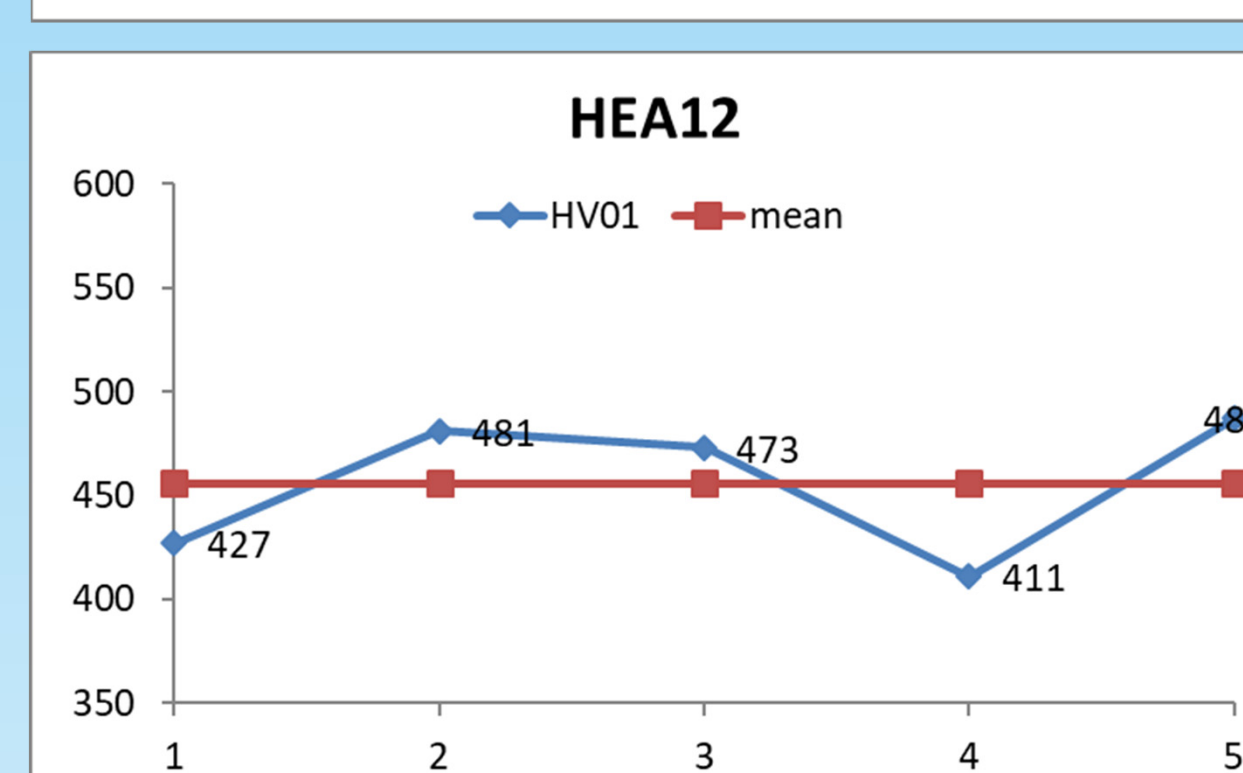
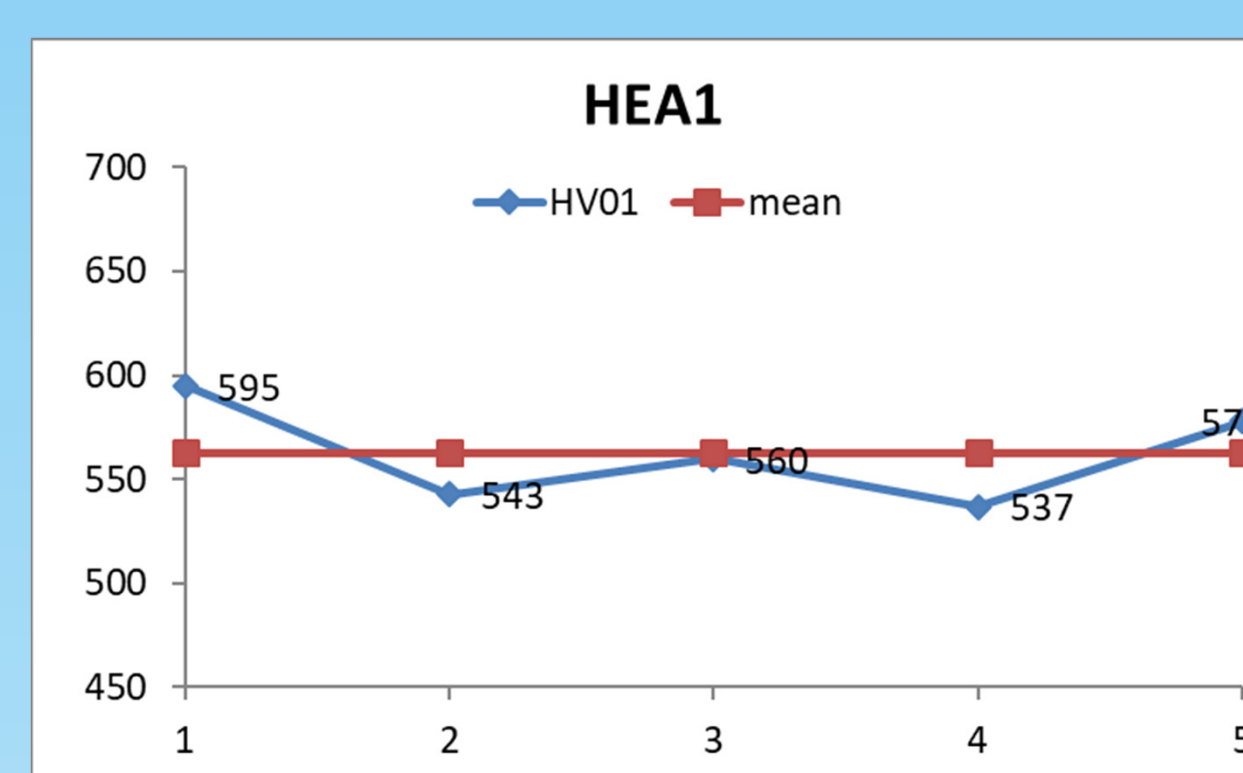


HEA14

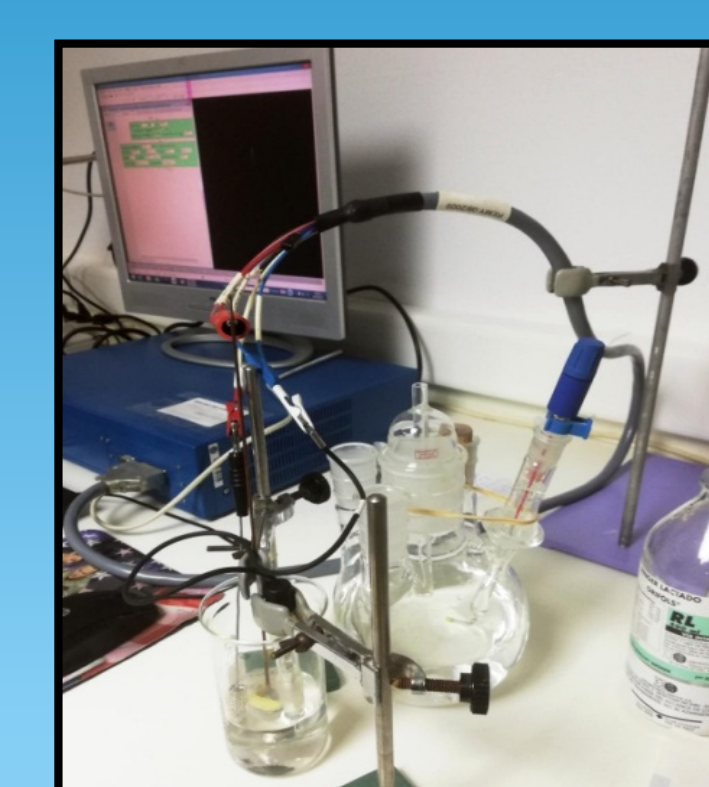
The microscopy examination reveals dendritic morphology for the reference alloy (AlCrFeCoNi) and the increase of the width of the interdendritic zones by increasing the nickel concentration.



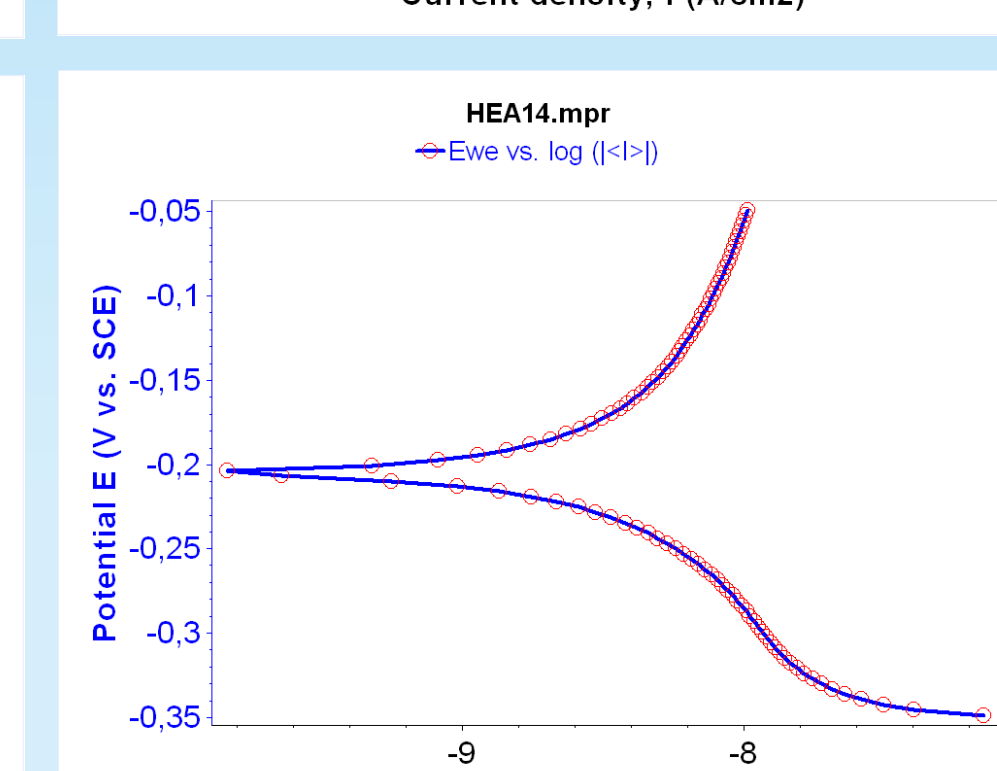
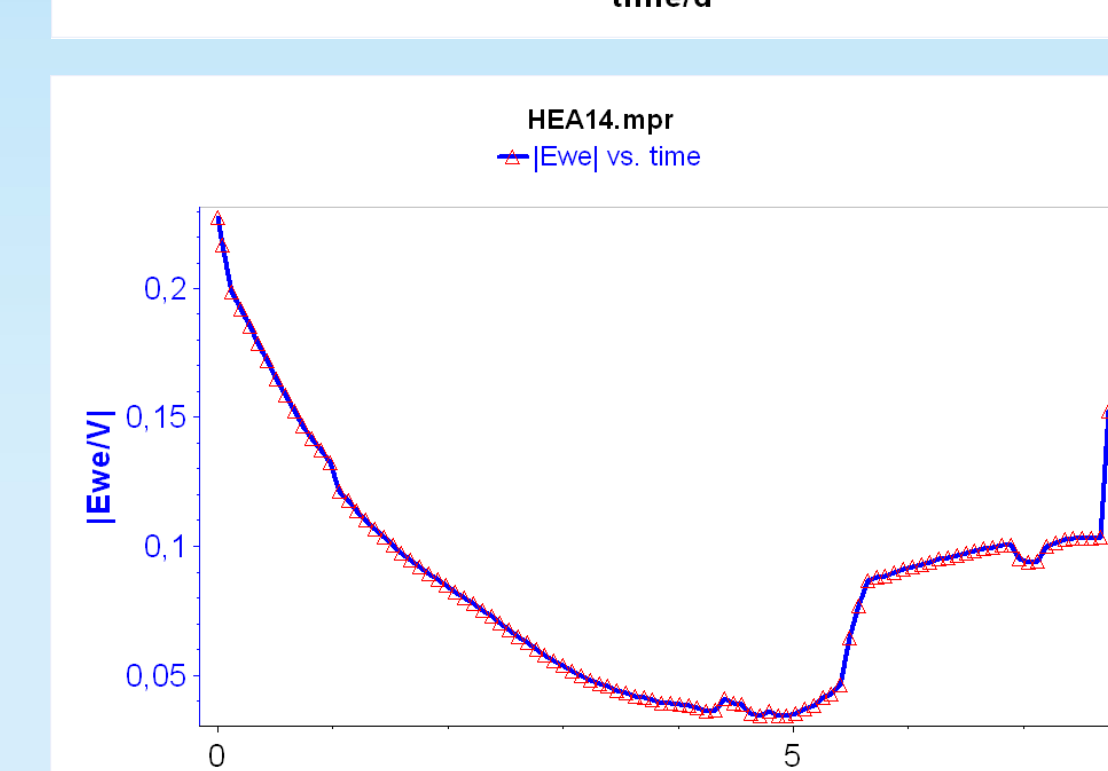
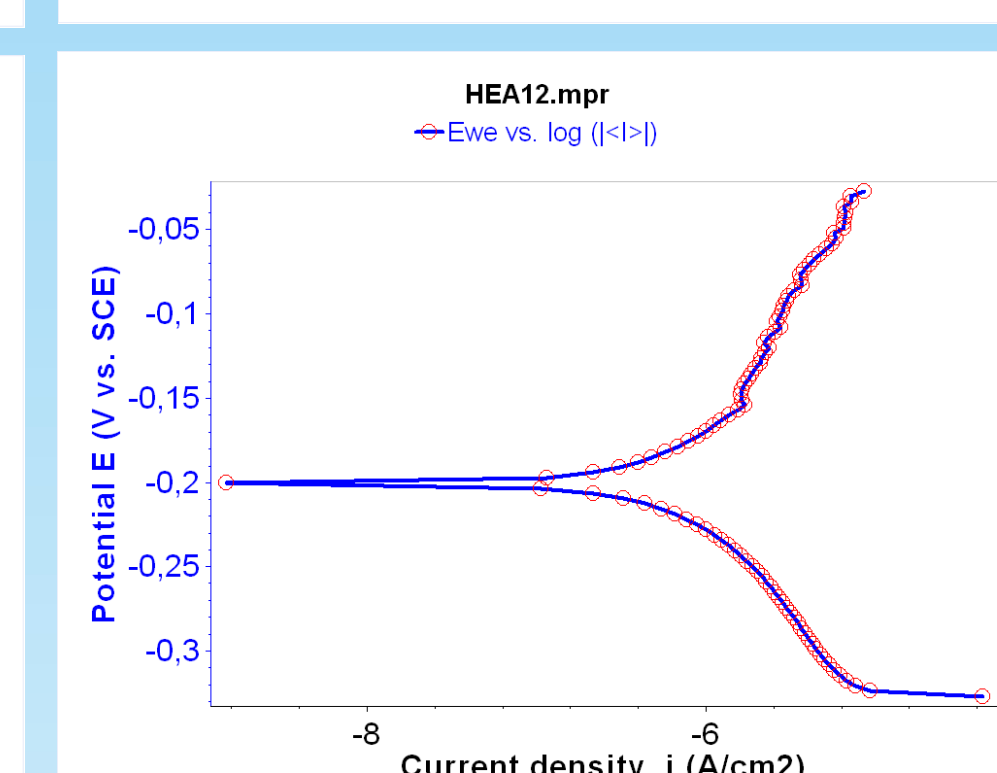
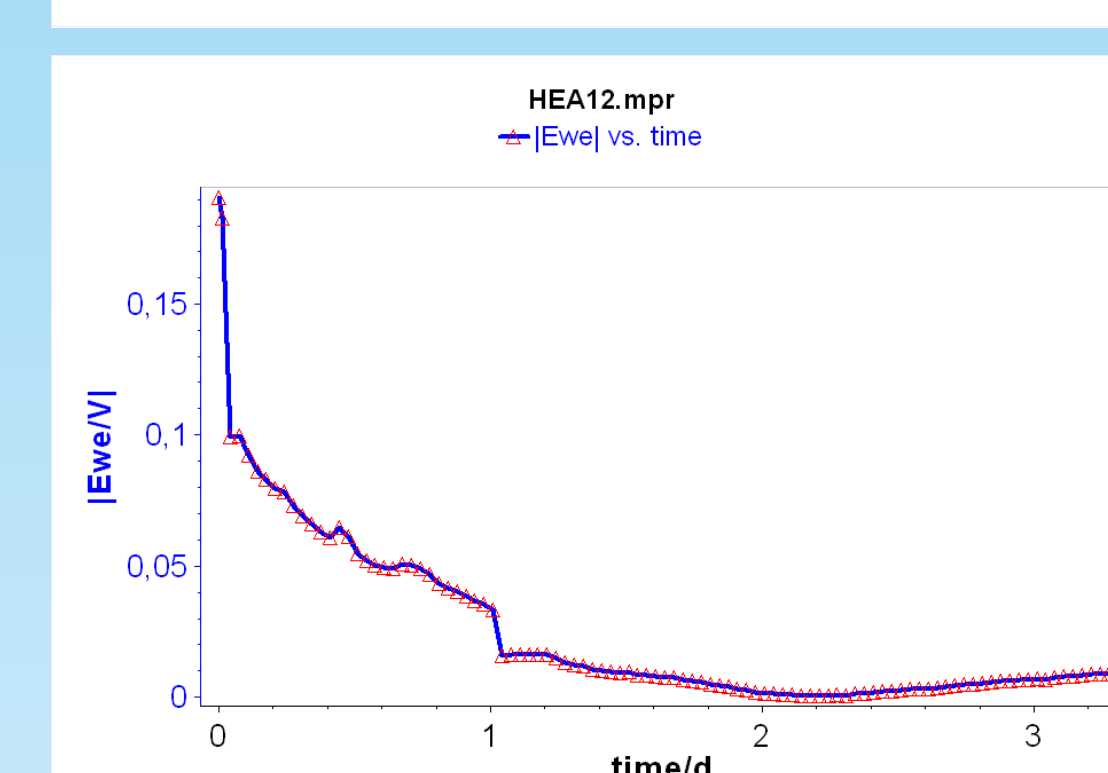
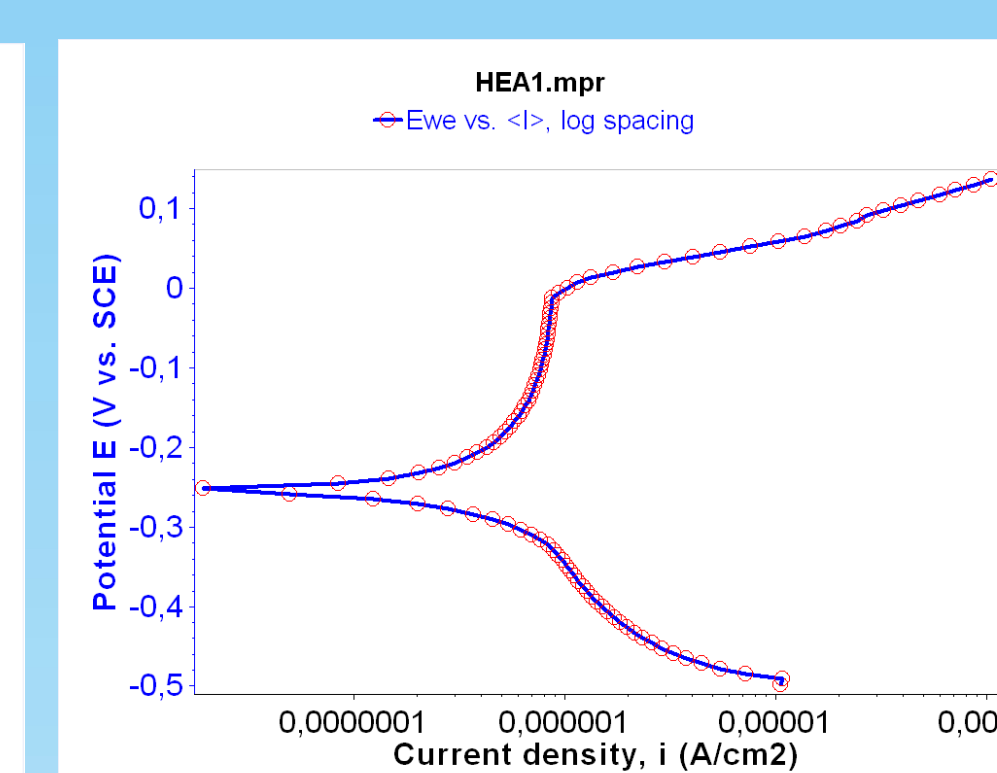
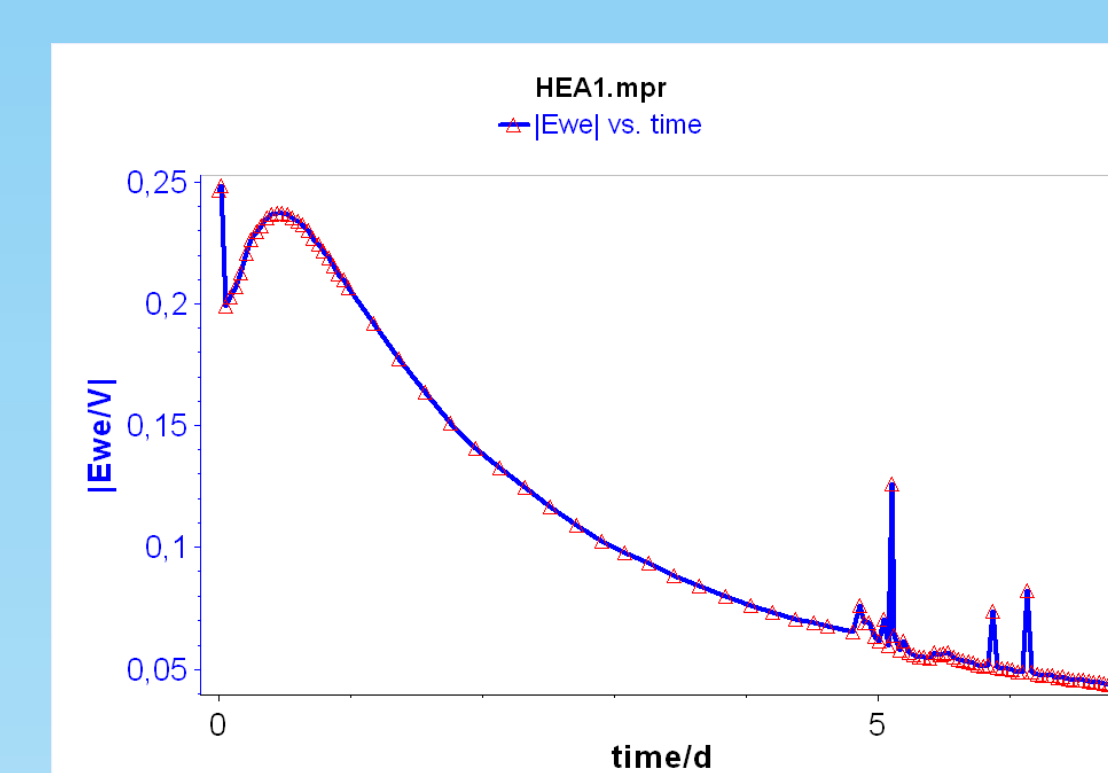
HARDNESS



Hardness values decrease with increasing the percentage of nickel because of the dissolution of precipitates in a nickel rich matrix and in consequence forming continuous solid solutions.



CORROSION



The alloys were immersed in SBS (Simulated Body Fluid) during one week. The low corrosion rates, low corrosion currents and high polarization resistance attest the good stability of HEAs in simulated biological environment.