

**Abstract:** This paper presents the microstructure and the mechanical properties of FeNiCrCuAl high entropy alloys. The microstructure and mechanical properties of the annealed FeNiCrCuAl high entropy alloys were investigated using scanning electron microscopy, and X-ray diffraction. HEAs have been known as a new type of materials and have been defined as having five or more principal elements, each one having a concentration between 5 and 35 atomic %. Previous researches show that HEAs can be processed to form simple solid solution structures instead of intermetallics and other complicated compounds. This phenomenon is commonly attributed to the high configurationally entropy in the solid solution state of HEAs. Furthermore, HEAs have also exhibited interesting properties such as high hardness and high strength, good thermal stability outstanding wear and oxidation resistance which offer great potential for engineering applications. The HEA systems explored in the past decade show that metallic elements are the most commonly used, e.g. Al, Cr, Fe, Co, Ni, Cu, Ti, etc. A wide range of HEAs exhibit high hardness, high strength, distinctive electrical and magnetic properties, high-temperature softening resistance, as well as favorable combination of compression strength and ductility. This combination of properties and the particular structures of HEAs are attractive for a number of potential engineering applications.