DESCRIPTION FOR THE GENERAL PUBLIC

High-Entropy Alloys are materials far different from conventional alloys known in materials science. The basic difference is that their structure contains at least five principal elements, which allows to obtain materials with innocuous properties resulting directly from synergistic effects of each individual component. The high-entropy alloys have special properties such as high hardness, abrasion resistance, thermal resistance etc. The aim of this work was to investigate alloys from the Al-Ti-Co-Ni-Fe-(Cr) system, in particular their synthesis methods. Leaving standard synthesis methods, such as arc furnace melting and mechanical alloying in favour of classical powder metallurgy may avert problems such as chemical segregation or intermetallic phase precipitation that result from the application of the first two methods. The plan of this work is to design, synthesise by means of arc furnace casting and powder metallurgy, and then characterize alloys from the Al-Ti-Co-Ni-Fe- (Cr) system with various alloying element contents. In order to determine the physicochemical properties of the obtained materials, light microscopy, scanning electron microscopy, differential scanning calorimetry, X-ray diffraction, and hardness testing will be used to determine the effect of the alloy's chemical composition on its microstructure. These investigations will allow to optimize the synthesis methods in order to obtain solid solutions. This is crucial in obtaining a high entropy effect. The results of the research will be complementary to existing knowledge on multi-component systems and will provide base information on the use of classical powder metallurgy for HEAs synthesis. The motivation for undertaking this research topic is the possibility of exploring science in the field of modern materials science.