

High entropy alloys constitute a novel approach in materials research. In this thesis, four novel alloys (namely NbTaTiZr, HfNbTaTiZr, HfNbTiVZr and HfNbTaTiVZr) are investigated. Their microstructure and mechanical properties are studied both in the as-cast and the annealed state. It is shown that their strengthening is caused by lattice distortions, which are the result of random filling of lattice sites by atoms of various elements with different atomic radii. Furthermore, positron annihilation investigations revealed that positrons actively search for open volumes in interstitial regions associated with lattice distortions, and therefore lattice distortions can be characterised by positron lifetimes.