This bachelor thesis is focused on a group of mostly high entropy alloys, composed of metals Cr, Cu, Hf, Fe, Mo, Nb, Ni, Ta, Ti, V, Zr, Co and Al, and their properties studied by scanning electron microscopy, Vickers hardness test and positron lifetime spectroscopy. One of the high entropy alloys' characteristic properties is a presence of local lattice distortion, the magnitude of which is commonly estimated by δr parameter. Based on Vickers hardness test, positive and statistically significant correlation between alloys' microhardness and δr parameter was evaluated. Estimated value of Pearson correlation coefficient is 0,5(1) and obtained p-value is of order 10^{-4}. That is below significance level 0,05. Based on positron lifetime spectroscopy, it was found out, that positron lifetime and δr parameter are not significantly correlated.