

Abstract: In the present work positron lifetime spectroscopy and coincidence spectroscopy of Doppler broadening of annihilation radiation were employed for investigations of defects in Mg alloys with icosahedral phase. Samples of WE43 alloy and WE43 alloy modified by addition of zinc were investigated. Positron trapping at vacancy-like defects associated with interface between the icosahedral phase $\text{Mg}_3\text{Zn}_6\text{Y}_1$ and Mg matrix was observed. Investigations of MgZnAl-based alloys were performed as well. Vacancy-like defects were not detected in MgZnAl-based alloys by positron lifetime spectroscopy. However, coincidence spectroscopy of Doppler broadening of annihilation radiation revealed that positron trapping in the vicinity of icosahedral $\text{Mg}_{44}\text{Zn}_{41}\text{Al}_{15}$ phase occurs. Several hypotheses explaining different nature of positron trapping in WE43-based and MgZnAl-based alloys were proposed.

Keywords: quasicrystals; positron annihilation spectroscopy; positron trapping; open-volume defects