

Current material research is going in improving behavior of lightweight magnesium alloy which have a wide use especially in a transport industry and a medicine. Mg-RE-Sc-Mn based alloys can be considered as a promising material for these applications. In the present work, there was studied thermal evolution of the phase transformations in Mg-RE-Sc-Mn based alloys by differential scanning calorimetry and measuring microhardness. The thermal responses at different heating rates were observed and the activation energies of the processes were calculated. The thermal responses were associated with individual precipitation or solvent processes based on a comparison with literature. Precipitation sequence of system Mg-Gd were observed in materials Mg5Gd1Sc1Mn and Mg10Gd1Sc1Mn. Precipitation sequence of system Mg-Y were observed in the material Mg4Y1Sc1Mn. Precipitation of particles Mn_2Sc and particles containing Mn and RE were detected in studied alloys. Hardening were not observed nevertheless there were not significant decreases of hardness in the during annealing up to 510 °C.