The development of magnesium alloys has the growing trend and leads mainly to the transport industry and modern medicine. The use of the alloying elements, especially rare-earth elements, is a way to improve the material utility. In the present work, there was studied thermal evolution of the phase transformations in the MgYNd alloys containing additional elements by differential scanning calorimetry. The thermal responses at different heating rates were observed and the activation energies of the processes were calculated. On the basis of confrontation with literature the precipitation and dissolution of stable, metastable phases were assigned to the observed processes. The thermal response corresponding to the precipitation of the stable β phase was observed in all materials. The activation energies of the stable β phase precipitation are practically identical for all materials investigated.