

Abstract

Modern aluminium alloys 60xx are rich in silicon and magnesium. They are easy to machine, are weldable, and can be precipitation-hardened, especially series 6061, which we focus on in this thesis. Series 6061 alloy is currently the most general-purpose industrially used aluminium alloy. The purpose of this thesis is to analyze the natural and artificial aging of these alloys through the utilization of positron annihilation spectroscopy and coincidence Doppler broadening of annihilation radiation methods. Our goal is precise analysis of precipitation processes, which occur due to natural or artificial aging of the alloy. Although artificial aging in aluminium alloys is a well researched area, understanding and description of key mechanisms controlling the natural aging especially in the early stages of precipitation is not yet sufficiently explained. We use modern methods of positron annihilation spectroscopy to understand and confirm our clustering hypotheses.