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Monitoring the Effect of Recrystallization and Quenching in AlMg<sub>x</sub> Alloy by Pat

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**Abstract:** Positron annihilation technique (PAT) lifetime measurements have been carried out on AlMg<sub>x</sub> samples ( $x = 0.23, 0.85, 1.27$  and  $1.4$  at %) with point defects and dislocations introduced by plastic deformation at room temperature. Clustering of vacancies was observed by quenching using PAT. The samples were annealed at 573 K for 12 hours to homogenize and divided into two sets. The first set of AlMg<sub>x</sub> ( $x = 0.23, 0.85$  and  $1.4$  at %) was deformed to 10, 25 and 35% thickness reduction. Isochronal annealing was studied in the range of 300-550 K. In the second set of measurements, AlMg<sub>x</sub> ( $x = 1.27$  Mg at %) was deformed to 31.25% thickness reduction. Variation in the mean lifetime with annealing time (Isothermal annealing at 323 K) was studied. On the other hand, the effect of the degree of deformation on change of the value of the mean lifetime with different concentration of Mg was studied. This work is able to distinguish the state of sample with different concentration of impurities. The deformed samples reach the bulk state at higher temperature. Grain growth occurred with increasing temperatures as shown by lifetime value. The effect of quenching from various temperatures range (373-823 K) was studied.

**Key Words:** Isothermal and Isochronal annealing; Deformation; Grain size; Quenching; Recrystallization.

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