

# Turkish Journal of Physics



Turkish Journal

of

Physics

Positron Annihilation and XRD Studies on Deformed Al-Alloys with low concentration of Mg

Emad BADAWI, M. A. ABDEL-RAHMAN, S. A. MAHMOUD  
Faculty of Science, Physics Department, El-Minia University-EGYPT  
A. A. RAMADAN  
Faculty of Science, Physics Department, Helwan University-EGYPT

 [Keywords](#)  
 [Authors](#)



[phys@tubitak.gov.tr](mailto:phys@tubitak.gov.tr)

[Scientific Journals Home](#)  
[Page](#)

**Abstract:** Positron behaviour at grain boundaries is characterized by their bulk diffusibility  $D$ , their bulk free lifetime  $\tau_f$  and their trapped lifetime  $\tau_t$  ( $\tau_t > \tau_f$ ). Al-Mgx samples ( $x = 0-1.4$  at %) have been homogenized at 573 K for 12 hours. The mean lifetime, as (indirectly) measured at various concentrations, show a good fitting with Sigmodel giving  $\tau_t = 180.664$  ps and  $\tau_f = 163.9$  ps. The mean lifetime was found to vary exponentially with the degree of deformation. The XRD study showed that preferred orientation occurred at degrees of deformation  $> 32$  %, whereas the peak intensity then increases with sample deformation. Heat treatment (recrystallization) is also followed by XRD study. The peak intensities decrease with increasing annealing time (attributed to recrystallization), but it does not completely reverse to the condition origin. For all cases, no peaks of Mg were revealed indicating the positron annihilation as a sensitive technique for detecting low concentrations in alloys.

---

Turk. J. Phys., **24**, (2000), 543-550.

Full text: [pdf](#)

Other articles published in the same issue: [Turk. J. Phys., vol.24, iss.4.](#)