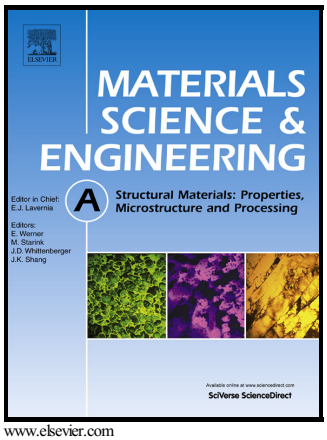

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Experimental evidence for segregation of interstitial impurities to defects in a near α titanium alloy during dynamic strain aging using energy filtered transmission electron microscopy

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Abstract

Dynamic strain aging was observed in the temperature range between 300°C and 500°C in a near α Titanium alloy 834 without Silicon (10.38%Al-0.16%Sn-1.86%Zr-0.37%Nb-0.25%Mo-0.27%C-0.30%O-0.006%N, all in at.%) tested in the temperature range from room temperature to 500°C. Electron microscopic investigation of tensile tested samples in an energy filtered transmission electron microscopy provided direct experimental evidence for segregation of interstitial elements like carbon (C) and nitrogen (N) to lath boundaries and dislocation pile ups. On the basis of these results and the comparison of lattice strain generated by different interstitials in α-Ti, it was concluded that segregation of carbon and nitrogen and not oxygen to defects is responsible for DSA in this alloy.

***Keywords*:** High temperature alloys; mechanical properties; diffusion; dislocations; Energy filtered transmission electron microscopy (EFTEM); dynamic strain aging.

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