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# The Effects of Mechanical Properties on Fatigue Behavior of ECAPed AA7075

**Abstract:** In this study, the effects of equal channel angular pressing (ECAP) on high-cycle fatigue and fatigue surface morphology of AA7075 have been investigated at a constant temperature (483 K) and the “C” route for four passes at ECAP process. ECAPed and as-received specimens were tested by four-point bending fatigue device. Fatigue tests were carried out by using 100, 120 and 140 MPa strength values. ECAPed specimens were characterized for each pass with optical microscope (OM), scanning electron microscope (SEM), energy-dispersive spectroscope (EDS), transmission electron microscope (TEM), selected area electron diffraction (SAED) and hardness measurements. Fracture surfaces of the specimens were also characterized with SEM. The results show that the highest hardness values (137 HV) and the best fatigue life ( $5.4 \times 10^7$  for 100 MPa) were measured in ECAPed four-pass sample. For this reason hardness values and fatigue life were increased with increasing number of severe plastic deformation (SPD) process.

**Keywords:** AA7075, equal channel angular pressing, fatigue behavior, mechanical properties

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