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Experimental investigation of the equal channel forward extrusion process
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Abstract
Among all recognized severe plastic deformation techniques, a new method, called the equal channel forward extrusion process, has been experimentally studied. It has been shown that this method has similar characteristics to other severe plastic deformation methods, and the potential of this new method was examined on the mechanical properties of commercial pure aluminum. The results indicate that approximate 121%, 56%, and 84% enhancements, at the yield strength, ultimate tensile strength, and Vickers micro-hardness measurement are, respectively, achieved after the fourth pass, in comparison with the annealed condition. The results of drop weight impact test showed that the increment of 26% at the impact force, and also decreases of 32%, 15%, and 4% at the deflection, impulse, and absorbed energy, are respectively attained for the fourth pass when compared to the annealed condition. Furthermore, the electron backscatter diffraction examination revealed that the average grain size of the final pass is about 480 nm. © 2015 by the authors; licensee MDPI, Basel, Switzerland.

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