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Al-Mufadi, F., Djavanroodi, F.

Equal-Channel Angular Pressing of Thin-Walled Copper Tube
(2015) *Arabian Journal for Science and Engineering*, 40 (9), pp. 2785-2794. Cited 7 times.

Abstract
During the last decade, materials with high strength-to-weight ratio have been in demand for industrial usage. Various severe plastic deformation methods such as SE process and HPTT process for tube-shaped specimens have been proposed and experimented. The common difficulty among these SPD techniques for producing tube-shaped specimens is theirs expensive and complicated setups. It is ideal to introduce a new method based on the simplicity of setup and low cost to produce thin-walled (R/t > 10, where R is the radius and t is the tube wall thickness) UFGed tube-shape component. Based on this conception, a new technique has been proposed and experimented. In this work, thin-walled copper tube specimens with 1 mm wall thickness and 23 mm diameter have been successfully ECAPed up to four passes through two different fundamental routes (BC and C) with the die channel angle of 90° using flexible polyurethane rubber pad. Hardness measurements on both annealed and ECAPed tubes show that 90 % increase in hardness value and also 200 % reduction in the grain size were achieved after four passes. Furthermore, the thickness measurement taken from several locations of the tube indicated that the process did not change the dimension of the deformed specimens. © 2015, King Fahd University of Petroleum & Minerals.

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