

## Effect of Equal Channel Angular Pressing Process on Impact Property of Pure Copper

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**Abstract :** Ultrafine grained (UFG) and nanostructured (NS) materials have experienced a rapid development during the last decade and made profound impact on every field of materials science and engineering. The present work has been undertaken to develop ultra-fine grained pure copper by severe plastic deformation method and to examine the impact property by different characterizing tools. For this aim, equal channel angular pressing die with the channel angle, outer corner angle and channel diameter of 90°, 17° and 20 mm had been designed and manufactured. Commercial pure copper billets were ECAPed up to four passes by route BC at the ambient temperature. The results indicated that there is a great improvement at the hardness measurement, yield strength and ultimate tensile strength after ECAP process. It is found that the magnitudes of HV reach 136HV from 52HV after the final pass. Also, about 285% and 125% enhancement at the YS and UTS values have been obtained after the fourth pass as compared to the as-received conditions, respectively. On the other hand, the elongation to failure and impact energy have been reduced by imposing ECAP process and pass numbers. It is needed to say that about 56% reduction in the impact energy have been attained for the samples as contrasted to annealed specimens.

**Keywords :** SPD, ECAP, pure cu, impact property

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