Paragraph Ran in the Queries

Paper Title: Improving ductility and strength of high-entropy alloy via multi-directional forging and annealing

Content :

Mechanical properties

Fig. 6 displays the tensile engineering stress –strain curves of different kinds of Fe50Mn30Co10Cr10 samples. All mechanical properties including yield strength (σY), ultimate tensile strength (σUTS), elongation at failure $\varepsilon\varepsilon$f and the product $\varepsilon\sigma$UTS×εf are summarized and list in Table 2. It should be noted that σY is measured via drawing a straight line starting at 0.2% of the plastic strain parallel to the initial tangent to the elastic curve. The stress at the point where this line intercepts the stress –strain curve is the yield strength [73]. σUTS is the maximum stress that a material can withstand before breaking and $\varepsilon\varepsilon$f is the elongation at failure. Among these five Fe50Mn30Co10Cr10 samples, the MDF sample presents the highest σY (~859 MPa) and σUTS (~1028 MPa) but the lowest $\varepsilon\varepsilon$f (~11%). After annealing treatments, both σY and σUTS decrease gradually with apparently increased $\varepsilon\varepsilon$f compared with the MDF sample. The MDF800 and MDF1000 samples exhibit both superior strength and ductility in contrast with the raw sample. The product of σUTS and $\varepsilon\varepsilon$f ($\varepsilon\sigma$UTS×εf) is used to evaluate the comprehensive mechanical property of materials [74], [75]. Overall, the MDF1000 sample shows the best mechanical property among these samples with the balanced combination of high σY, σUTS and good $\varepsilon\varepsilon$f.