The effect of rapidly solidified on shape memory behaviour in Ti-Ni-Cu alloys

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Ti–Ni–Cu alloys have been attracting attention by their high performance of shape memory effect and decrease of thermal and stress hysteresis in comparison with Ti–Ni binary alloys. Furthermore, rapidly solidified Ti–Ni-Cu alloy ribbons have been known to have the shape memory effect and superelasticity superior to the alloy ingots obtained by conventional casting. Shape memory characteristics of $Ti_{43.5}Cu_{37.8}Ni_{18.7}$ and $Ti_{58.4}Cu_{25.6}Ni_{16}$ alloys ribbons prepared by melt spinning were investigated by differential scanning calorimetry (DSC) and X-ray diffraction (XRD). In these experiments, particular attention has been paid to change of the wheel linear velocity from 21 to 63 m/s. Eventually the amorphous ribbons without any crystal phases can be produced in $Ti_{43.5}Cu_{37.8}Ni_{18.7}$ and $Ti_{58.4}Cu_{25.6}Ni_{16}$ alloys at the highest cooling rate. Then the cooling rates of ribbons were controlled. In this work the effect of this wheel linear velocity and annealing on shape memory behavior was systematically investigated.

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