

Size control of nano structured TiNi alloy by variation of the electrolyte concentration

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Titanium Nickel (TiNi) alloy exhibits excellent properties, such as thermal shape memory effects, super-elasticity, good corrosion resistance and high damping properties. These properties make it an ideal applicant in the field of biomedical applications such as the minimal access surgery, intracoronary stent, the replacement of ligaments, the shape memory micro valve to control drug delivery precisely, bone stamp and the osteosynthesis devices, etc.

There have been continuous efforts to further enhance the properties of TiNi alloys to best suit the above applications. One such method is to control the size of TiNi nano alloys and study its properties.

In the present work, nano structured titanium-nickel alloys were electrodeposited from citrate electrolyte solutions on the ITO-coated glass plates at room temperature. The concentration of Ti was varied from 0.01 to 0.1 M in the electrolyte. The samples were characterized by UV-Vis, XRD, XPS, SEM and TEM techniques to reveal that the average size of nanoparticles could be tailored in the range of 20 to 25 nm for lower Ti concentration and in 15-20 nm range for higher Ti concentration.