

AMORPHIZATION AND SELF PROPAGATING HIGH TEMPERATURE REACTION OF TITANIUM AND NICKEL DURING POROUS NITINOL SYNTHESIS

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TÓM TẮT:

This reports presents two important phenomena tha were found during doing the research on synthesis of porous NiTi (Nitinol) to apply for biomaterials were 1) Amorphization of NiTi alloying during mechanical alloying; and 2) Self propagating high temperature reaction. The results shown that the amorphous phase started to form after milling of 15hours and it completely formed at 25 hours during MA process at room temperature. SHS reaction occurred at the minimum preheating temperature of $T_p = 600^{\circ}\text{C}$ with the ignition temperature of 1400°C , the mixing time is (0 - 2)h. The phase of NiTi product is NiTi, based on X-ray diffraction pattern. The microstructure showed that the SHS product has higher open and connected pores where wuold be the space for growing of human muscle. The microstructure also showed that the is no boundary between the powder particles. It means that Ni and Ti were completely diffused to each other, which cuold not be obtained by other sintering methods.