

Erwan Sulistiono, 2005, "Pengaruh Temperatur Sintering Terhadap Karakteristik Paduan Logam Nikel-Titanium (Ni-Ti) Berpori," SKRIPSI dibawah bimbingan Drs Siswanto, M.Si dan Jan Ady, S.Si, M.Si, Jurusan Fisika, FMIPA, Universitas Airlangga Surabaya.

ABSTRAK

Penelitian ini dilakukan untuk mengetahui pengaruh temperatur sintering terhadap karakteristik paduan Ni-Ti (kekerasan, kuat tekan, strukturmikro, laju korosi dan toksitas) dan bagaimana sifat yang dibentuk setelah sintering. Paduan Ni-Ti dibuat dengan mencampur serbuk Ni dan Ti dengan komposisi 90%Ni-10%Ti dengan teknik metalurgi serbuk. Serbuk dicampur dengan teknik pencampuran basah (*wet mixing*), kemudian dipress dan disintering dengan variasi temperatur 750, 800, 850, 900, 950 °C selama masing-masing 6 jam. Sampel dikarakterisasi sifat kekerasannya dengan metode Vickers, kuat tekan (*compressive strength*) dengan Autograph, strukturmikro dengan mikroskop optik, laju korosi dengan metode berat sisa dan toksitas dengan metode aktivitas enzim urease.

Berdasarkan karakterisasi yang dilakukan pada paduan Ni-Ti, didapatkan nilai kekerasan tertinggi sebesar $(263,53 \pm 23,96)$ VHN diperoleh pada temperatur sintering 950 °C, *compressive strength* tertinggi $(3862 \pm 0,1)$ N diperoleh pada temperatur sintering 950 °C, strukturmikro paduan Ni-Ti pada temperatur sintering 750 °C masih acak dan kurang homogen sedangkan pada temperatur 950 °C ukuran dan distribusi homogen, teratur dan memiliki karakteristik lamel berombak. Ini menunjukkan sampel memiliki kerapatan tinggi. Laju korosi terendah $(0,00347 \pm 0,0003)$ gram/cm²hari diperoleh pada temperatur sintering 950 °C. Dari uji toksitas didapatkan, paduan Ni-Ti tidak menghambat kerja enzim urease karena pH larutan masih menunjukkan keadaan basa, artinya sampel tidak bersifat *toxic*.

Untuk penelitian mendatang disarankan untuk mengetahui perkembangan fasa dapat digunakan *X-Ray Diffraction* (XRD). Uji mekanik dapat ditambahkan uji tarik dan uji kekuatan impak, sedangkan uji toksitas bisa digunakan uji *toxic screening tissue culture*.

Kata kunci : sintering, metalurgi serbuk, kekerasan, *compressive strength*, laju korosi, strukturmikro, toksitas.

Erwan Sulistiono, 2005, *The Effect of Sintering Temperature to Characteristic of Porous Nickel-Titanium (Ni-Ti) Alloys*. Under guidance of Drs. Siswanto, M.Si and Jan Ady, S.Si, M.Si, Department of physics, faculty of mathematics and natural science, Airlangga University.

ABSTRACT

The purpose of this experiment to find the effect of sintering temperature to characteristic of Ni-Ti alloys (hardness, compressive strength, microstructure, corrosion rate and toxicity) and to find the quality of Ni-Ti after sintering. Ni-Ti alloys is made from Ni and Ti powder with composition 90%-10% by powder metallurgy. Powder Ni and Ti mixed by wet method then pressed and sintered in vacuum. The variation sintering temperature in this research is chosen 750, 800, 850, 900, 950 °C held for 6 hours and cooled to room temperature. The characterization Ni-Ti alloys such as hardness with Vickers method, compressive strength with Autograph, microstructure with optical microscope, corrosion rate with weight lost method and toxicity with activity of urease enzym.

Based on the characterization of Ni-Ti alloys, experiment and testing result show the highest hardness value ($263,53 \pm 23,96$) VHN is obtain with sintering temperature 950 °C, highest compressive strength value (3862 ± 0.1) N is obtain with sintering temperature 950 °C. Microstructure of Ni-Ti alloys sintered 750 °C is not homogenous while the size and distribution of Ni-Ti alloys sintered 950 °C is homogenous, neat and have a wave-layer. It's show that the sample had high density. The low corrosion rate value ($0,00347 \pm 0,0003$) gram/cm²day is obtain with sintering temperature 950 °C. Toxicity testing show that Ni-Ti alloys is not pursue to the activity of urease enzym, it's meant Ni-Ti alloys non toxic.

For future experiment, necessary to doing experiment with other characterization such as X-ray diffraction to knowing the phase of Ni-Ti, impact force, tensile strength to increasing the quality of alloys and for toxicity testing is able to use toxic screening test with tissue culture.

Key word : sintering, powder metallurgy, hardness, compressive strength, microstructure, corrosion rate, toxicity