

## **PADUAN NI-CU-MN SEBAGAI LOGAM ALTERNATIF KEDOKTERAN GIGI : Efek Penambahan Elemen Aluminium dan Indium Terhadap Sifat Kekuatan Tarik Paduan**

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### **Abstract**

The five ternary alloys such as 20Ni-40Cu-40Mn, 30Ni-30Cu-40Mn, 30Ni-40Cu-30Mn, 40Ni-30Cu-30Mn and 50Ni-30Cu-20Mn were prepared and compared with a commercial alloy 84Ni-9Cr. The ternary Ni-Cu-Mn cast alloys were studied on hardening by the addition of elements such as aluminium and indium to the ternary alloys. The wax pattern for the tensile specimen had dimensions of 1,0 mm x 15 mm as a shaft and had an expanded end (diameter 2,0 mm x 5 mm) where the shaft was joined at the expanded end to tensile machine (Autograph DCS-500). Tensile tests showed that both the 20Ni-40Cu-40Mn (which has the lowest melting temperature of all the Ni-Cu-Mn ternary alloys investigated) and the 50Ni-30Cu-20Mn (with the highest melting temperature) exhibited a ductile behaviour. Dendritic structures seen by optical microscopy were constituted of ternary alloys containing aluminium and indium and the amount of dendritic structures increased in the indium-containing alloys rather than in the aluminium containing alloys, and as a result the hardness (VHN) had larger values in the latter alloy than in the former alloys.

### **Pendahuluan**

Seperti diketahui berbagai penambahan elemen logam ke dalam paduan logam dasar berhubungan dengan formasi fasa metal dan gambaran mikrostruktur serta karakteristik logam paduan.<sup>1,2</sup> Efek penambahan ber-

bagai elemen logam dapat tercermin pada sifat mekanis paduan. Sifat kuat tarik atau tensil yaitu 0,2% proof stress dan elastik modulus paduan logam dasar tidak lebih baik dari paduan emas yang digunakan untuk restorasi gigi tiruan.<sup>3,4</sup> Sifat tensil dari paduan logam dasar terutama

dipengaruhi oleh kondisi saat proses pengecoran seperti temperatur lebur, temperatur saat pemanasan mould dan atmosphere saat logam cair.<sup>5</sup>

Disamping itu komposisi kimia dari logam paduan juga merupakan faktor penting dalam sifat tensil.<sup>6,9</sup> Perlakuan panas