Effect of alloying elements on pore characteristics of lotus-type porous Cu-X alloys (X = Ni, Co, Mn, Si, Sn, P)

Sang-Wook Kim, Ji-Woon Lee, Taek-Kyun Jung, Soong-Keun Hyun

PII: S1044-5803(16)30801-4
DOI: doi: 10.1016/j.matchar.2016.11.001
Reference: MTL 8441

To appear in: *Materials Characterization*

Received date: 27 July 2016
Revised date: 28 October 2016
Accepted date: 1 November 2016

Please cite this article as: Kim Sang-Wook, Lee Ji-Woon, Jung Taek-Kyun, Hyun Soong-Keun, Effect of alloying elements on pore characteristics of lotus-type porous Cu-X alloys (X = Ni, Co, Mn, Si, Sn, P), *Materials Characterization* (2016), doi: 10.1016/j.matchar.2016.11.001

Effect of alloying elements on pore characteristics of lotus-type porous Cu-X alloys (X=Ni, Co, Mn, Si, Sn, P)

Sang-Wook Kim[a], Ji-Woon Lee[a], Taek-Kyun Jung[a] and Soong-Keun Hyun[a]*

[a]*Department of Materials Science and Engineering, Inha University, Incheon 22212, Republic of Korea*

Abstract

The effect of alloying elements on the formation of long cylindrical pores was investigated for lotus-type porous Cu. The lotus-type porous Cu was fabricated using the centrifugal casting technique under hydrogen atmosphere with the addition of Ni, Co, Mn, Si, Sn, or P. The porosity and average pore diameter were significantly affected by the addition of alloying elements. The porosity was independent of the addition of Ni or Co but decreased with increasing Mn, Si, Sn, or P content. The average pore diameter exhibited minimum at 0.05 at% Ni content and 0.02 at% Co, Mn, or Si. It then increased as the content of alloying elements was increased up to 0.1 at%. The average pore diameter sharply increased with increasing Sn or P content up to 0.1 at%. It is suggested that the addition of alloying elements is an effective way to control the porosity and average pore diameter in lotus-type porous Cu without additional change of processing parameters such as the hydrogen gas pressure and solidification velocity.