Production and properties of metal foams from non-ferrous metals alloys

Vlasta Bednářová, Petr Lichý, Tomáš Elbel, Ivo Lána*
Department of Metallurgy and Foundry, VSB – Technical University of Ostrava, 17. listopadu 15/2172, 708 33 Ostrava - Poruba, Czech Republic. vlasta.bednarova@vsb.cz
*Slévárna a modelárna Nové Ransko, Nové Ransko 234, 582 63 Ždírec nad Doubravou

Metal foams belong thanks to their unique properties into the group of new and perspective materials. The paper deals with foundry procedures used for production of cast metal foams based on non-ferrous metals alloys. Individual procedures of production in lab and pilot conditions are described, which result in casting with certain structural regularity. Attention is paid also to the obtained microstructure of these cast materials and to evaluation of their properties. The experimental part summarises the existing research works in this area, including future possibilities of their use. Cast metal foams are not yet produced in Czech Republic on industrial scale.

Keywords: metal foams, aluminium alloys, microstructure

Acknowledgement

This work was elaborated within the frame of the research project TA02011333 (Technology Agency of the ČR).

References

[1] BANHART, J. (2005). Aluminium foams for lighter vehicles. *International Journal of Vehicle Design*, Vol. 37, No. 2/3, pp. 114–125.

[2] BANHART, J. (2001). Manufacture, characterisation and application of cellular metals and metal foams. *Progress in Materials Science*, Vol. 46, pp. 559–632.

[3] MICHNA, Š. (2005) Encyklopedie hliníku. Prešov, ISBN 80-89041-88-4.

[4] GAILLARD.Z- DAIRON, J-FLEURIOT, M.: Les materiaux cellulaires: une innovation aux applications multiples, Fonderie, 2010, Issue 1, pp. 21-33.

[5] PAULIN, I., et. al.: Synthesis of aluminium foams by the powder metallurgy process – compacting of precursors, *Materiali in Tehnologie/Materials and technology* 45 (2011) 1, pp. 13-19

[6] DAIRON,J. et al.: Mousses métalliques: CTIF innove dans les matériaux cellulaires. Fonderie - Fondeur d´aujourd´hui, 2009, Issue 295, pp.12-19.

[7] CHOLEWA,M.,DZIUBA-KALUŽA,M.:Analysis of structural properties of skeleton castings regarding the crystallization kinetics, Archives of Materials Science and Engineering, (38),2009,Issue 2,pp.93-102

[8] NOVAKOVA-MARCINCINOVA, L., JANAK, M. (2012). Application of progressive materials for rapid prototyping technology. *Manufacturing Technology*, Vol. 12, No. 12, pp. 75-79

[9] NOVAKOVA-MARCINCINOVA, L., NOVAK-MARCINCIN, J., TOROK, J., BARNA, J. (2013). Selected experimental tests of materials used in rapid prototyping area. *Manufacturing Technology*, Vol. 13, No. 2, pp. 220-226.

[10] TILLOVÁ, E., CHALUPOVÁ, M., HURTALOVÁ, L., ĎURINÍKOVÁ, E. (2011). Quality control of microstructure in recycled al-si cast alloys. *Manufacturing Technology*, Vol. 11, No. 1, pp. 70-76.

[11] CZAJKOWSKA et al:Application of Electron Scaning Microscope in the Analysis of the Structure of Casting Non- Conformities Aimed at Optimization of Technological Process Parameters, *Manufacturing Technology*,Vol. 13, No.2,pp.164-169

[12] BŘUSKA,M. at al.: Influence of repeated remelting of the alloy RR.350 on structure and thermo-mechanical properties, *Manufacturing Technology*, Vol. 13, No. 1, pp. 31-35

 Paper number: M201349

Manuscript of the paper received in 2013-08-25. The reviewer of this paper: *Dalibor Vojtech.*