

Corrosion Properties of AlSi10Mg Alloy Prepared by Gravity Casting and 3D Printing Technology

Michaela Fousova^{1,2}, Drahomir Dvorsky^{1,2}, Dalibor Vojtech¹

¹Department of Metals and Corrosion Engineering, Faculty of Chemical Technology, University of Chemistry and technology Prague, Technická 5, 166 28 Prague 6, Czech Republic. E-mail: fousovam@vscht.cz, dvorskyd@vscht.cz, vojtechd@vscht.cz

²Institute of Physics, Academy of Sciences of the Czech Republic (AS CR), Na Slovance 1999/2, 182 21 Prague 8, Czech Republic.

Aluminium and its alloys are widely used in the transport industry. In combination with 3D printing technology, lightweight parts can be successfully achieved. 3D-printing of AlSi10Mg alloy is already well-managed. However, corrosion behaviour of such 3D-printed material has not been intensely studied yet. This paper is thus focused on a primary determination of corrosion properties of AlSi10Mg samples prepared by SLM technology and on comparison with conventionally gravity cast samples in thermally untreated and treated state (T6). Audi immersion test has revealed the 3D-printed samples are the most vulnerable to local corrosion attack, while the as-cast samples are the most resistant. In all three material states, selective dissolution occurred as result of microgalvanic processes between silicon particles and aluminium matrix. Eutectics and α -Al solid solution in between the inter-cellular network were attacked preferentially in the cast and 3D-printed samples, respectively.

Keywords: AlSi10Mg, corrosion, casting, 3D printing

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