

Effect of lithium on the structure of A000 brand aluminum alloy

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The article presents the structural change of cast aluminum alloy when alloying aluminum alloy grade A000 lithium alloy. In the experiments, a lithium fluoride compound was used as a solder. Based on the conducted experiments, the article draws conclusions.

Keywords: aluminum, alloying, A000 brand aluminum, lithium

Currently, aluminum and its alloys are used in many industries. First of all, aluminum and its alloys are widely used in the aerospace and automotive industries. In addition, aluminum is increasingly used in other branches of mechanical engineering, electrical industry, instrument making, construction, chemical industry, consumer goods production [1].

In the experiment, a combination of aluminum and lithium fluoride was obtained as an object of research. The mass value of the components contained in the A000 brand aluminum alloy is given in Table 1 in %.

Lithium fluoride is a binary chemical compound of lithium and fluorine and is a lithium salt of hydrofluoric acid. Under normal conditions, it is a white powder or a transparent colorless crystal, a non-hygroscopic, almost insoluble compound in cold water. It is soluble in nitrate and hydrofluoric acids [2-3].

Table 1. The content of aluminum grade A000

Aluminum alloy grade	Mass fraction, in %							
	Main components		Combinations				Other components	
	Al	Fe	Si	Cu	Mg	Zn	Ga	Additional alloys
A000	Main component	0,4-0,5	0,07	0,01	0,02	0,04	0,01	0,18

100% of the total amount of flux in the first experiment is 5% lithium. 100% of the total amount of flyus in the second experiment is about 10% lithium. In the third experiment, 100% of the total number of flyus is about 15% of the anniversary[4-5].

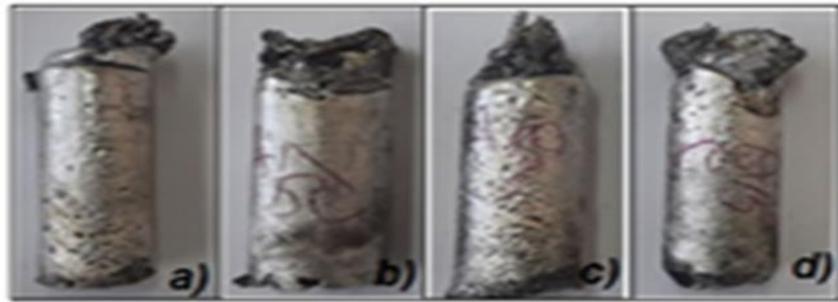


Figure 1. Samples.

In order to compare in the study, first of all, the A000 brand aluminum alloy was poured without any additives. The amount of fly in all samples was reduced from 100 gr to the same amount of tigel. Sample details were poured into pre-prepared sand-clay molds.

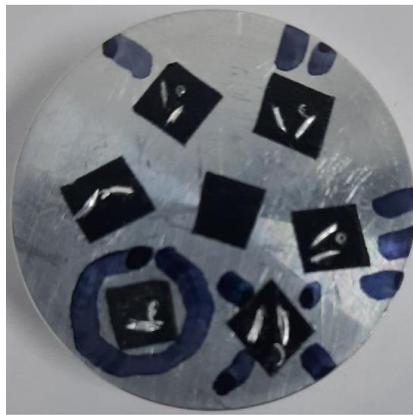
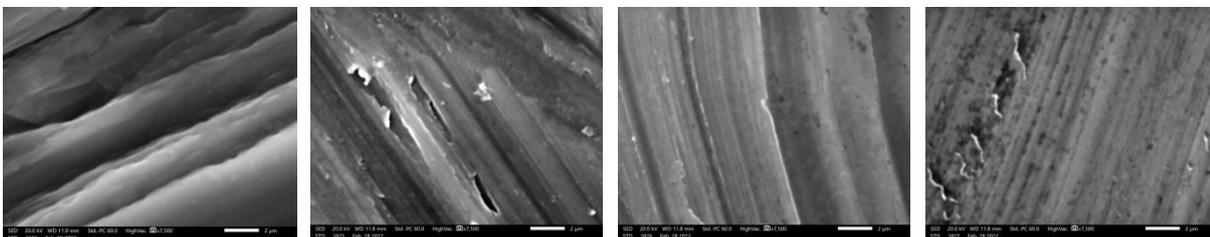


Figure 2. Cut pieces from samples.

The obtained samples were analyzed using an electron microscope of the JMS-IT 200 model [6]. To do this, small pieces were cut out of the every sample, as shown in figure 2, and fixed on a special microscope device. Photos taken with a microscope are presented in 3 figure.



1)

2)

3)

4)

Figure 2. 1- 5% LiF; 2- 10% LiF; 3-15% LiF; 4- aluminum grade A000.

Experimental analysis shows that the harmful nonmetallic additives contained in the aluminum alloy with the addition of lithium fluoride are reduced to the calculation of the lithium content fluoride. Microscopic analysis of this is shown.

REFERENCES

1. Lithium. V. K. Kulifeev, V. V. Miklushevsky, I. I. Vatulin, M.: MISiS. - 2006, 240 p.
2. Тураходжаев, Н. Д., Турсунбаев, С. А., Одилов, Ф. У., Зокиров, Р. С., & Кучкарова, М. Х. (2020). Влияние условий легирования на свойства белых чугунов. In *Техника и технологии машиностроения: материалы IX Международ. науч.-техн. конф. (Омск, 8-10 июня 2020 г.)* (p. 63).
3. Betsofen, S. Y., Wu, R., Grushin, I. A., Petrov, A. A., & Speranskii, K. A. (2021). Deformation Mechanism, Texture, and Anisotropy of the Mechanical Properties of MA14, VMD7-1, and Mg–5Li–3Al Alloys. *Russian Metallurgy (Metally)*, 2021(4), 437-442.
4. Nodir, T., Sarvar, T., Andrey, J., & Yahyojon, M. (2021, September). Mathematical Model for Calculating Heat Exchange. In *International Conference on Reliable Systems Engineering* (pp. 243-249). Springer, Cham.
5. Turakhodjaev, N., Tursunbaev, S., Turakhujaeva, A., Akramov, M., Turakhujaeva, S., & Kamalov, J. (2021). Calculation of the heat exchange process for geometric parameters. *International Journal of Mechatronics and Applied Mechanics*, 1(9), Pp:90-95.
6. Sarvar, T., Munira, K., Otabek, X., & Azamat, B. Features of electrochemical machining of magnetic-hard materials “EPRA International Journal of Multidisciplinary Research. *Volume, 6*, 252-254.