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THE EFFECT OF LITHIUM FLUORIDE COMPOUND ON SLAG DECOMPOSITION IN THE PROCESS OF CASTING ALUMINUM PREPARED DETAILS

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ABSTRACT

The article analyzes the dependence of a lithium-fluorine-containing compound on the release of slag in the manufacture of cast parts from aluminum alloys. Experimental samples were obtained by firing in a resistance furnace at 750 ° C. In the experiments, a different amount of fluorine-lithium compound was used as a flux. Aluminum grades AK7 and D16 were used in the research. The article also presents the authors' conclusions about the effect of the fluorine-lithium compound on the release of slag based on the experiments conducted.

KEYWORDS: *AK7, D16, slag, aluminum oxide, lithium fluorine, furnace, detail, sand-clay molds.*

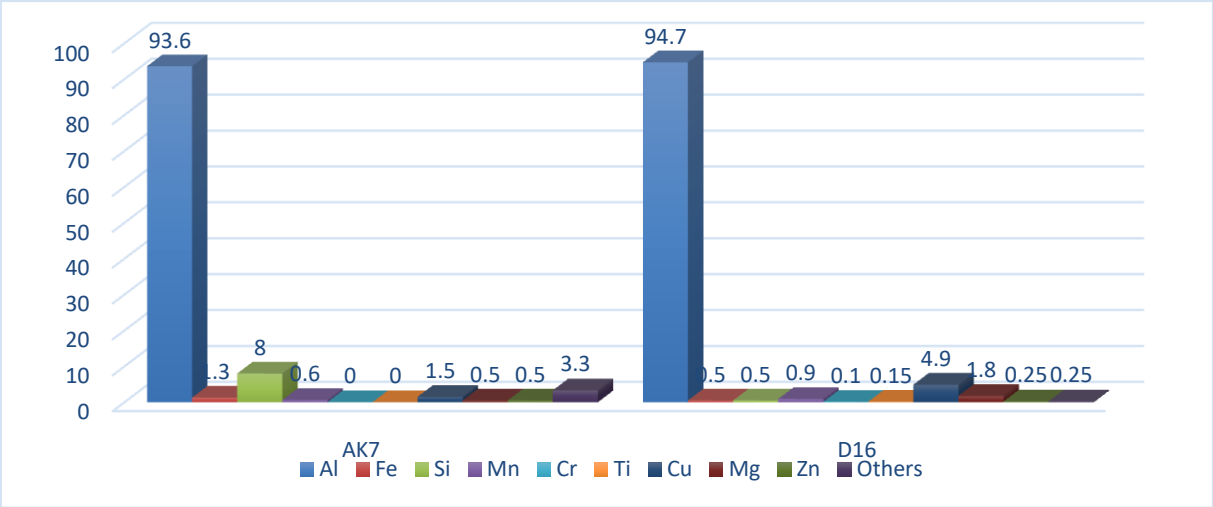
INTRODUCTION

In Uzbekistan, a large number of parts in machine-building production are made of aluminum alloys. For example, several machine-building enterprises of Uzbekistan, such as UzAuto INZI, UzAuto Powertrain, “Uzikkilamchiranglimetall”, produce various parts and semi-finished products from aluminum alloys. Slag aluminum and aluminum alloys released from it during the smelting of aluminum are one of the urgent problems of the production of parts and semi-finished products. In the process of aluminum liquefaction, many useful elements fall out of the slag. This, in turn, leads to the loss of metal. If proper measures are not taken to prevent excessive slag formation, as well as to maximize the extraction of metallic aluminum from it, this can lead to significant losses of potentially suitable metal.

Materials

Aluminum grades AK7 and D16 were chosen as the object of research in the research work. The diagrams below show the chemical composition of the aluminum grades used in the study.

Chemical composition



In the research work, a resistance furnace was used to obtain samples. The samples were poured into sand-clay molds. The composition of the forms of Catfish clay consists of the following: 85% quartz sand, 11% bentonite clay, 4% water. In the same composition, a molding mixture was prepared and mixed in a mixer until a homogeneous mass was obtained. Taylor lays out the finished opaque mass in front of him, and puts the samples into molds by pressing. The experiments were carried out on standby mode a, at which the furnace was heated to 750 °C. In experiments, lithium fluoride compound was added in an amount of 5%, 10%, 15% compared to the mass of the shell. The weight of the charge for the samples was 80 grams. To develop a connection diagram, the samples were first poured without the addition of lithium fluoride. A 5% sample was injected, then a 10% sample and a 15% sample were poured into molds.

Figure 2 The process of measuring the mass of the charge

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The Slags, separated from the samples during the molding process, are presented in figure 3 and in figure 4. Each separated slags weighed mass was measured. The results of the measurement are presented in Table 1.

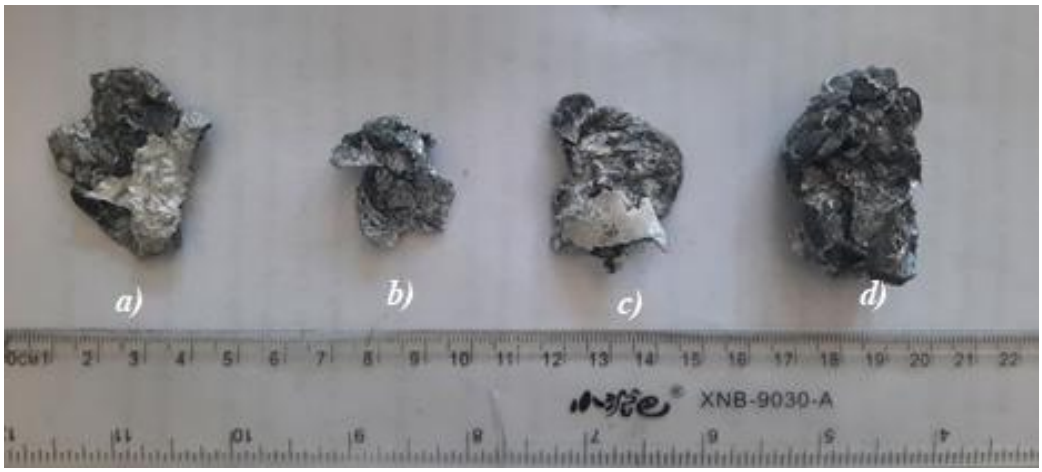


Figure 3. The Slags separated from the samples were:a-lithium fluoride without the addition of AK7; B-lithium fluoride with the addition of 5%; c - lithium fluoride with the addition of 10%; d-lithium fluoride with the addition of 15%.

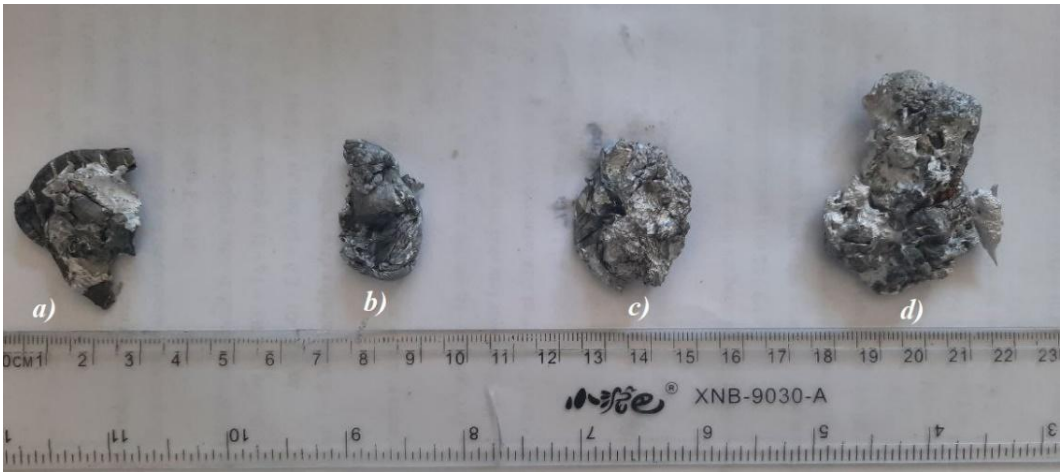
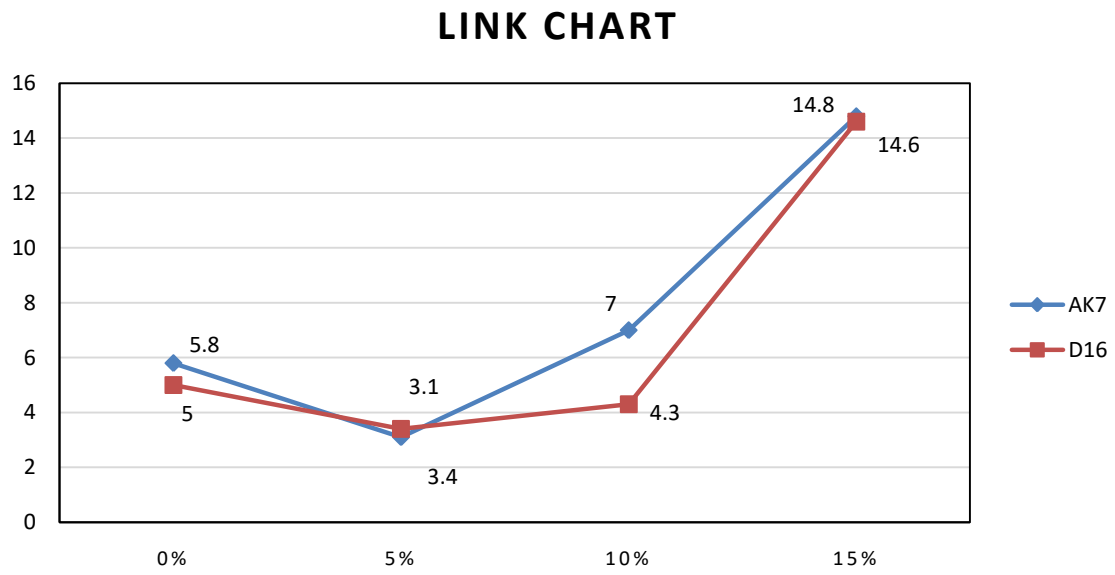


Figure 4. The Slags separated from the samples were:a-lithium fluoride without the addition of D16; B-lithium fluoride with the addition of 5%; c - lithium fluoride with the addition of 10%; d-lithium fluoride with the addition of 15%.

TABLE 1 MASS MEASUREMENT OF SLAGS SEPARATED FROM SAMPLES

№	Lithium fluorine not included	5% lithium fluoride added	10% lithium fluoride added	15% lithium fluoride added
AK7	**5.8 gr**	**3.1 gr**	**7 gr**	**14.8 gr**
D16	**5 gr**	**3.4 gr**	**4.3 gr**	**14.6 gr**

Based on the measurement results, a graph of lithium fluorine evaporation before slag separation has been developed.



CONCLUSIONS

From the experiments carried out, the following conclusions can be drawn:

1. The use of lithium fluoride compound as fluoride in the process of liquefaction of aluminum reduces the decomposition of slag;

2. During the application of lithium fluoride compound as a flyer to the AK7 brand, the separation of slags in samples with the addition of 5% lithium fluoride compound with slag separated from the sample without the addition of a flyer led to a decrease of 40-47%.

3. In the process of using a lithium fluoride compound as a flyer for the D16 brand, the separation of slags in samples with the addition of 5% of the lithium fluoride compound with the slag separated from the sample without the addition of a flyer led to a decrease of 31-35%.

4. When using lithium fluoride, the separation of slag from the AK7 and D16 brands increased by more than 10%.

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