

EFFECT OF CALCIUM STEARATE ON THE PRODUCTION OF ALUMINUM POWDER

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Abstract: This work presents the conditions for passivation of the surface of a newly activated aluminum powder using calcium stearate, changes in its chemical properties during mechanical action. Experiments have shown that the rapid, self-sustaining reaction of activated aluminum with water occurs even at room temperature and leads to almost 100% hydrogen formation under appropriate operating conditions. The reaction rate can be controlled by the size of the aluminum particles, water temperature, metal activation conditions, and the metal-water mass ratio.

Keywords . Aluminum powder, calcium stearate, melting point, calcium, particle.

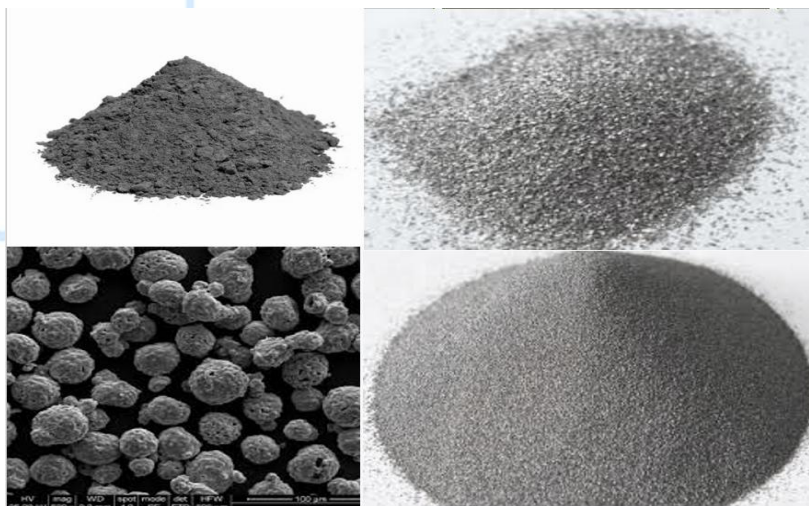
Introduction Today, the need for metal surface enrichment with aluminum powder in industrial enterprises and the demand for aluminum powder in many areas is increasing. In particular, according to customs data, 2-3 thousand tons of aluminum powder are imported into our republic annually. The production and implementation of this imported product in Uzbekistan is one of the current topics today. The effectiveness of the aluminum powder die-casting process with the participation of calcium stearate and divinyl spirit to condition aluminum is considered high.[1-2]

1 table

Physico-mechanical properties of calcium stearate

Calcium stearate	Technical specifications	Results
Appearance	White powder with an oily odor	Pass
Melting point, °C	140.0-158.0	147.2
Free fatty acid,%	0,5 Maks.	0,25
Losses on drying,%	3.0 Maks.	2.9
Calcium determination,%	6,5 ± 0,6	6.9
Particle size (325 passes the test)	99,0% Min.	99,6%

During the dispersion process, the surface area of aluminum increases and it becomes easier to react with oxygen in the air. Sometimes it can even burn in the grinding machine. It is required that the substances that passivate the surface of aluminum do not react with it. Calcium stearate performs this function and its amount is required to be no more than 30 grams per 1 kg. Calcium stearate has been found to help passivate the surface of aluminum in the grinding shop.



1 picture 1 picture Aluminum dispersion level

2 table

Use of calcium stearate in the production of aluminum powder

Raw materials	I	II	III	IV	V	VI
Aluminum pieces	80	98	95	90	88	90
Calcium stearate	15	2	4	8	9	10
UAYT spirt	5		1	2	3	
Dispersion (mesh)	300	550	350	400	450	400

Conclusion: In order to produce aluminum powder and reduce its dispersion, it is advisable to add calcium stearate in the amount of 2-5%. Calcium stearate, when coating the aluminum surface, achieves passivation and prevents the powder from reacting with oxygen in the air.

References

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2. L.M. Rojas-Díaz, L.E. Verano-Jiménez, E. Muñoz-García, J. Esguerra-Arce Production and characterization of aluminum powder derived from mechanical saw chips and its processing through powder metallurgy Powder Technology Volume 360, 15 January 2020, Pages 301-311.