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## Article 1

**Shekhovtsov V. V., Volokitin O. G.**

**Technology of producing different structure microspheres based on ash waste by plasma method**

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**Keywords:** ash wastes, microspheres, electroplasma installation

## Abstract

In this paper the possibility of obtaining microspheres with different structure on the basis of ash and slag waste TPP-1 (Ekibastuz, Kazakhstan) using low-temperature plasma. Developed electroplating stand for obtaining microspheres and determined the optimal regimes of thermal impact on the agglomerated powders on the basis of ash and slag waste. The obtained microspheres are characterized by low bulk density (dense 1,1–1,2 g/cm<sup>3</sup>, the hollow of 0.3–0.4 g/cm<sup>3</sup>) and their diameter (30–70 μm thick, hollow 20–90 μm). Smaller particles are mostly transparent, while the larger particles are opaque and have different colors.

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## Article 2

### **Koshelev Yu. I., Bubnenkov I. A., Shvetsov A. A., Bardin N. G., Sorokin O. Yu., Makarov N. A. Siliconized graphite: physico-chemical basis of production and development prospects. Part 2. The influence of structural features of carbon materials on the degree of their interaction with silicon**

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**Keywords:** gravity, structural components, micro texture parameter, prismatic plane, the base plane

## Abstract

It is reported that the structural peculiarities of the carbon materials influence the reactivity with Si. Graphitization degree is a necessary but not sufficient requirement for the selection of carbon materials to be siliconized. Other structural peculiarities are proposed which can yield the optimal requirements for the liquid silicon infiltration (LSI) process.

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### Article 3

**Koshelev Yu. I., Bubnenkov I. A., Shvetsov A. A., Bardin N. G., Sorokin O. Yu., Makarov N. A. Siliconized graphite: physico-chemical basis of production and development prospects. Part 3. The influence of thermal effects and impurity elements in the silicon and the carbon material on the process of siliconization**

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**Keywords:** carbon materials, siliconized graphite, silicon carbide, thermal effects, impurity elements

### Abstract

It is shown that the interaction of carbon materials with Si lead to the rapid thermal release during the siliconization process. As a result high thermal stresses induced can result in cracks initiation in siliconized blanks. Manufacture of defect-free blanks is also dependent on the impurities content in raw materials.

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### Article 4

**Miryuk O. A.**

**Promoting of the cell formation and hardening magnesium composition**

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**Keywords:** mixed magnesium binding, hydration, hardening, cellular structure

### Abstract

The results of studies of the effect of the composition and method of preparation of molding masses on the formation of a cellular structure and the hardening of magnesium compositions are presented. The choice of the type and concentration of raw components is substantiated. The expediency of mechanical activation of the mixed magnesium binder is shown.

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### Article 5

**Shurigina Ju. N., Pavlikova S. M., Anisimova S. V.**

**Properties of polymer-cement compositions using aqueous dispersions of styrene-acrylic copolymers**

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**Keywords:** polymer compositions, waterproofing, dispersion of styrene-acrylic copolymers, elastifiers

### Abstract

The results of the development of dispersions of styrene-acrylic copolymers used as components of polymer-cement compositions for the formation of elastic waterproof coatings for concrete bases are presented. Dependencies of the properties of polymer-cement compositions on the glass transition temperature of copolymers are determined.

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## Article 6

**Samchenko S. V., Krivoborodova S. Yu.**

**The influence of plasticizer on the recrystallization and hardening of calcium aluminate**

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**Keywords:** calcium aluminate, crystal hydrate morphology and formation, hexagonal and cubic of calcium aluminate hydrate, recrystallization, plasticizer

## Abstract

The aim of the study was to establish the influence of the plasticizer based on polycarboxylate on the formation and morphology of the formed hydrated phases. The mechanism of structure formation at the hydration of  $12\text{CaO}\cdot 7\text{Al}_2\text{O}_3$  in the presence of the plasticizer, which consists of the formation of fine poorly crystallized hexagonal crystals of calcium aluminate hydrate. The presence of the superplasticizer in the composition gidratirovana calcium aluminate slows down the nucleation and growth of crystalline hydrates-formed on the surface of the partition liquid and solid phases of the film, creating structural and mechanical barrier, which leads to slow saturation of the liquid phase, but contributes to the formation of a larger number of crystallization centers and the concurrent growth of small crystals as hexagonal and cubic habit.

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