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INFLUENCE OF THE INTERNAL STRUCTURE OF THE BUILDING MATERIAL ON THE DRYING PROCESS

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A B S T R A C T

In the article, molecular physics related to the significant progress achieved at the atomic-molecular level, as well as the wide use of new physics, a deeper penetration into the essence of microprocesses in the construction processes and the consideration of corpuscular models depending on the atomic-molecular structure, molecules, atoms, ions that form wet materials, it is recommended to take into account the interaction forces between bodies.

K E Y W O R D S

Molecule, atom, ions, body, process, energy, momentum, dislocation, metal, lattice, adsorption, oxygen, thermal expansion, electron, particle, crystal, evaporation zone, drying.

Introduction

The drying process depends on the strength, shape, properties, hardness or softness of the materials, the number of defects and the design and types of drying devices, and has a significant impact on the formation of the product structure, its final properties, the possibilities of further technological processing and storage stability [1-4].

Until recently, drying processes were mainly studied in terms of macroprocesses and drying areas, while individual phases were considered as continuous models represented as a continuous closed environment, the body volume and, accordingly, the analysis of transfer processes in them was based on phenomenological ideas [5-11].

At the current modern stage of development, drying of the material should be considered as a process of phase separation in heterogeneous systems under the conditions of interaction of its external and internal parts, the initial stage of this movement has a decisive effect and is called the initial impulse.

The concept of "impulse" is taken from mechanics, and in developing this analogy, it is also recommended to use the concept of "impulse force", which represents the time of the initial impact on the drying object, during its impact with the driving force of the drying process. That is, it takes into account the duration of the application of the initial active force of the drying process.

The structure of materials means the distribution and interconnection of gaseous, glassy (amorphous) and crystalline phases, their physico-chemical nature and quantitative relationships, form of structure its micro and macro structure is understood. The microstructure is determined by the nature of the crystalline phase, the glassy phase and the combination with pores and their structural character. The macro structure determines the size, structure, shape, and mutual arrangement of pores in materials [12-19].

In the fig.1 2000 times magnified photos of 20μc macro and micro cracks and pores in the internal structure of the dispersed material are shown.

Drying of materials is determined by the amount of microcracks in it depending on the surface. It is impossible to immediately determine the reasons for their formation. Their main reasons are:

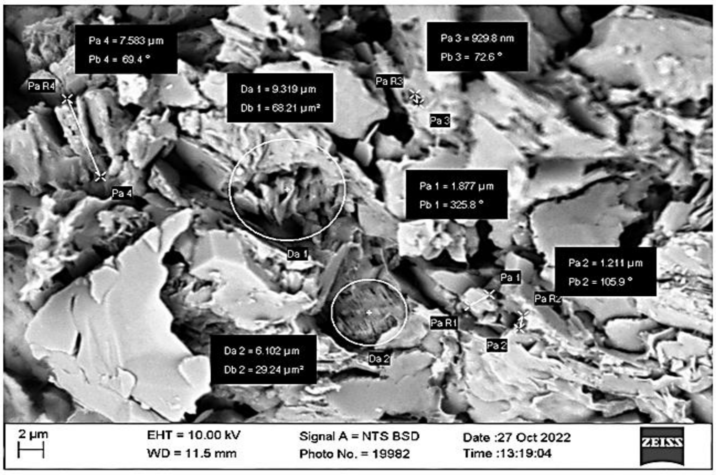
A) Mechanical damage to the surface of the material in the process of obtaining the finished material;

B) Thermal expansion of polycrystalline materials at different coefficients in individual phases;

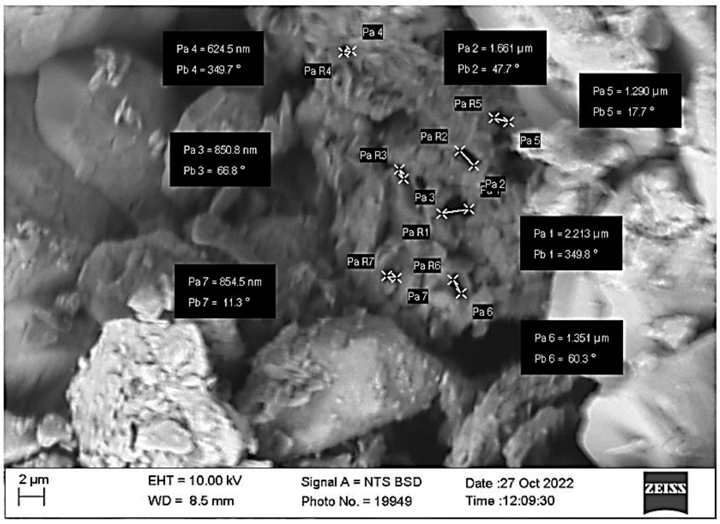
V) Chemical corrosion of the surface during the production of the material;

G) Connection of dislocation in the process of plastic deformation of the material [2].

a)



b)



c)

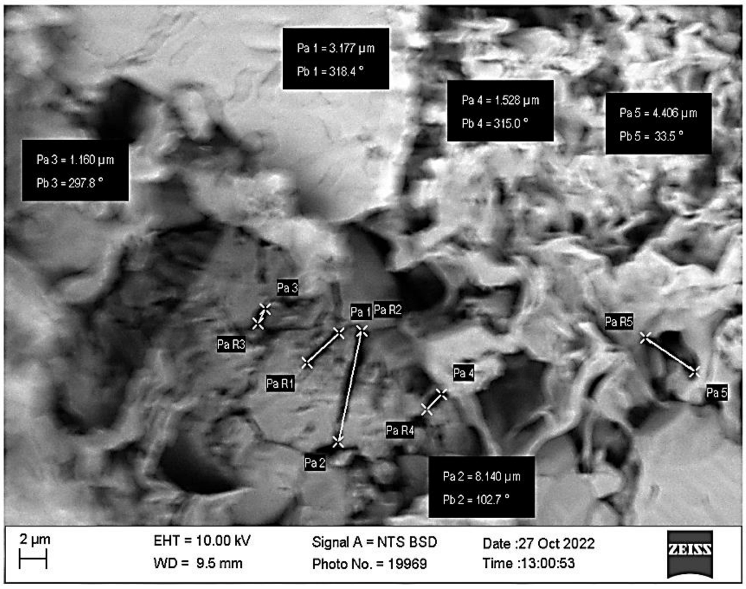


Fig. 1. Photomicrograph of the internal structure of the dispersed material.

a) loam; b) soil; c) limestone

The process of obtaining the finished material is always related to its primary mechanical processing. For raw materials, this is the process of mining, subsequent grinding and sorting, and for molded materials, this is the process of mixing the initial compounds. At all these boundaries on the surface, the initial initial joints have a partial mechanical effect, which leads to the formation of not only microcracks, but also macrocracks. Here we are not talking about technological cracks in products, but about defects on the surface of individual compounds [20-28].

Often, the material is directed to heat treatment during the preparation process. The difference in the coefficient of thermal expansion is the reason for the formation of surface microcracks. Here we are talking not about technological thermal micro-cracks, but about micro-cracks with a multi-phase structure formed between fireclay and clay particles [29-34].

It is known that the freshly exposed surface of many minerals has high chemical activity. Adsorption of this surface by foreign ions or molecules leads to chemical corrosion and partial destruction of the surface layer. For example, the failure of quartz with Si-O bonds occurs with the formation of microcracks on the surface of the structure of the crystal itself. In this case, in cracks on the surface, Si and O ions are formed with unsaturated valence bonds. Such a surface has a high energy and is characterized by a very reactive effect, on which oxygen atoms from the ambient air are immediately adsorbed, which leads to a decrease in surface energy [35-43].

Metals and alloys obtained in a normal environment are composed of a large number of crystals oriented in different directions in space, that is, they are formed in the polycrystalline state. These crystals are called particles and their shape is irregular. Each particle in the crystal lattice has its own orientation, which is different from the orientation of the neighboring particle.

Electron microscope studies show that the structure of the materials, that is, the structure of the internal crystal particles of metals, is not properly formed. A solid metal crystal lattice contains various defects that disrupt the bonding of atoms and affect the properties of the metal. These defects in the lattice are the result of incorrect arrangement of atoms in the lattice.

Dislocation is a special form of imperfection located in the crystal lattice, and naturally they are less different from other defects. Dislocation is a special arrangement of individual atoms. Figure 2 shows a micrograph of dislocation traces. At present, the direct presence of the dislocation has been proved.

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