

SUMMARY OF DISCIPLINE

1. **Discipline:** Technical petrography
2. Conventional designation (code) in education plans B.M.1.1.
3. **Direction 18.04.01:** "Chemical Technology"
4. Specialization "Chemical technology of refractory non-metal and silicate materials"
5. **Qualifications (degree)** Master of Engineering
6. **Provides department** Department of Silicate and Nanomaterials Technology
7. **Coordinator:** Ph.D. Associate Professor Mitina Natalia Aleksandrovna, E-mail:

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8. **Learning outcomes:**

1. Apply theoretical knowledge in the field of petrography refractory non-metal and silicate materials in the study of the mineral and chemical composition of ceramics, binders glass, glass ceramics and composites based on them.
2. Independently perform calculations the basic characteristics of materials when assessing the possibility of using non-metallic raw materials in the production of traditional and new materials.
3. Apply experimental methods of petrographic analysis of refractory non-metal and silicate materials.

9. **Contents:**

Module 1: The processes of synthesis of mineral matter in the technology.

Low-temperature transformation of minerals. Mehanogennye transformation. High-temperature processes of solid-phase synthesis. The behavior of minerals under heating. Sintering. Recrystallization. The nature of the porosity of the ceramic body. Primary porous structure. Transition continuously porous structure in discrete porous. Coalescence and healing of porous. Liquid-phase sintering. The mechanism and the driving force of the process. Synthesis of technical stone from the melt. Petrurgiya. Electric-arc melting. Crystallization ability of melt. Obtaining technical stone from solutions. Low-temperature synthesis. Hydrothermal synthesis. Crystallization from solutions melt at high pressure.

Module 2: Theoretical bases of mineralization in the art. Genetic types and the main thermodynamic parameters of the technical mineral formation.

Module 3: Structural and genetic analysis of the technical stone. The concepts: individual mineral, mineral aggregates, genetic criteria. Genesis and structure of technical stone. Mehanogennye structure and texture. Structures crystallization from the melt solution. The secondary structure formation in technical stone. Zoning in refractories and ceramics. The change of phase composition and structure of cement stone and concrete in service in corrosive environments.

Module 4: Systematics and description of artificial minerals and inorganic compounds. Oxides. Oxygen-free compounds. Silicates.

10. **Semester:** 3rd

11. **Prerequisites:** Б3.В.1.1. Mineralogy and Crystallography

12. **Credit cost of discipline:** 4 credits

13. **Type of intermediate certification:** exam, grading test

Teacher Mitina N.A.

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