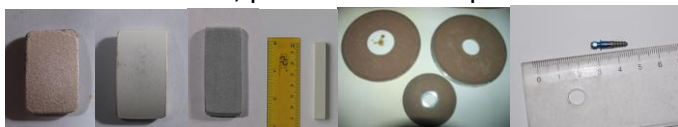




Direction: New Materials and Nanotechnology

1. The name of innovation development: Oxide-ceramic coatings with a complex of controlled properties on the basis of plasma and electrolyte technologies.
2. Purpose and scope of application: Thermal protection, protection from high temperature, salt and other types of corrosion, friction protection, dielectric protection, decorative coatings. Developed oxide-ceramic coatings (OCC), due to its properties, can be used in the following industries: aerospace, instrument-making, electronic, chemical, oil and gas, automotive, tool, construction, engineering and medical.
3. Main characteristics, development essence: Coating material - oxide ceramics; Coverage thickness - 40 ... 250 microns; Roughness of coating - adjustable; adhesion - 100%; porosity - regulated; microhardness - up to 16 GPa; wear resistance - during dry friction increases in 30 times, in cavitation - 17 times; corrosion resistance - increases by 1 ... 3 orders; color - white, light and dark gray, light and dark pink.  
The process of plasma and electrolytic oxidation is carried out according to the scheme of "anode-cathode" in conditions of surface spark discharges on the treated surface (anode) as a result of plasma and chemical reactions, and control of properties of coatings can be changed by the composition of the electrolyte and modes of synthesis.
4. Comparison with the world analogues, main advantages of the development: The proposed rational technology of plasma and electrolytic oxidation in  $\text{Ca}(\text{OH})_2$  electrolytes allows to receive protective coatings with high wear resistance, as well as high hardness and anticorrosion effect. The application of oxide-ceramic coatings to products leads to increasing of products' durability, and reduces the cost equipment repairing.
5. State of the protection of intellectual property: "Development of the method of synthesis in electrolyte plasma of wear and corrosion resistant oxide and ceramic coatings on magnesium and zirconium alloys", No. of state registration 0105U004320, 2005-2006.
6. Market demand: In medical industry it is possible to make based on titanium and zirconium bio-ceramics for implants in dentistry, artificial joints and vertebrae, for bone reconstruction, etc. Perspective is also the application of such coatings in machine building. In order to increase the level of the characteristics of paint and varnish coating proposed OCC can be used as an intermediate coating before applying paint to enhance its adhesion strength.
7. Development readiness condition: experimental sample.
8. Color illustrations, photos of development:



9. Coordinators for communication:  
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