

New Technologies of GlassCeraX Ltd Company - Utilization of Coal Ash

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ABSTRACT

Coal ash's chemical composition is similar to high-alumina glasses with a small content of alkaline and alkaline-earth elements and a high iron content. GlassCeraX Ltd Company has developed a series of new glass ceramic compositions from fly ash.

The general content of fly ash in the utilized raw materials is 60 – 95%.

Developed materials have a dense glass ceramic structure. Material's density – up to $2.7-2.8 \cdot 10^3 \text{ kg/m}^3$. Porosity – less than 0.02%. Mechanical characteristics: bending strength – up to 160-200 MPa; impact strength – 12-15 kJ/m² ; micro-hardness (HV) - up to 10 GPa. Young's modulus – 100 GPa, Temperature strength under load: 1150°C.

Wear resistance: five times excelling at the customary building ceramic material.

Adhesion in the stick on to the concrete – is 1.5 - 4.0 times (dependence of the glue) excelling of the standard requirements.

Discharge of radon Rn²²² lower than the sensitivity level of the control-measuring equipment. The level of radioactive emission of material is 22 times less than of permissible.

Glass ceramics are water-resistant and are stable to acids and alkali influence, they possess with high electro-and heat-insulation characteristics. Materials can be machining (cutting, grinding, and polishing).

Owing to combination of high decorative, physical-chemical and construction characteristics, the developed materials can be widely used in civil- and industry engineering for advantageous replacement of natural marbles and granites upon building facing (outside and inside), laying floors, building of terrace and partitions, tiled roof etc. Many super strong glass ceramics could be used for the bulletproof plates production and other protect samples.

Materials can be used for lining of different capacities, including with aggressive surroundings. The materials are also used for manufacture of fastening elements, coatings, high-voltage insulators, parts of pumps, heat exchangers and other products.

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