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GEOPOLYMER COATING OF FILLERS

Technical task:

Balls made of waste glass, hollow glass balls, clay balls are severely damaged or ground when used in injection moulding, extrusion or mixing guns for adhesives, presumably due to the pressures and porous surface. This means that it is not possible to use this sustainable, low-cost raw material as a filling material in plastics with conventional large-scale production and adhesives (2-component).

Initial situation:

Major disadvantages of using waste glass as a filler are the damage caused by injection moulding (etc.), which makes the use of this raw material impossible. Therefore other raw materials have to be used, which cause higher costs.

Solution:

A ceramic coating of geopolymer provides a porous or pressure-sensitive filler such as recycled glass and expanded clay or lava stone with a resistance for processing in industrial plastic processes.

Examples would be in adhesives for maintaining an adhesive gap (spacers, cost and density reduction) or in plastics (density reduction, increase of energy absorption, improvement of acoustics, reduction of combustibility, reduction of material price).

Spheres of a certain particle size distribution (demand is matched to the use of injection moulding, RTM, adhesive) are coated with geopolymer in a mixer.

For example, geopolymers (water glass and metakaolin) can be mixed in a pot roller.

Alternatively, other mixing devices such as drum mills and ball mills for the preparation of coated balls are conceivable.

Mixers with two dosing units for controlling the necessary flow measurements are preferred. The respective percentage distribution of water glass or geopolymer can then be easily adjusted via the control system.

The ball surfaces are closed and hardened by the movement of the balls in the geopolymer.

This makes it possible to use them as fillers in plastics processing. Possible applications are fillers and sealants in injection moulding material, RTM technology (resins), as well as adhesives and sealants.

Advantages:

- Cost reduction of the material
- Targeted improvement of filler properties

Coating with Geopolymer

- Polycondensation of aluminium silicates at RT
- Materials
 - Metakaolin (e.g. Metapor from Poraver)
 - Fly ash (e.g. from staeg power minerals)
- Alkaline activator
 - NaOH or KOH
- Formation of a ceramic-like coating
- Compressive strength of up to 80 N/mm² after one day of curing



Figure 1