OPTIMAL CHEMICAL COMPOSITION OF MODIFIED POLYAMIDE WASTE AGGLOMERATE

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The polyamides recycling possibility makes them sustainable and environmentally safe materials by reducing the waste volume in landfills, reducing the production carbon footprint and its cost, since the waste polymer materials processing is cheaper than new production. Compared the secondary processing of traditional thermoplastic polymers (polyethylene, polypropylene, etc.), the secondary polyamide 6 processing is often more complicated and unpredictable in terms of obtaining secondary raw materials with stable and predictable strength and exploitation characteristics.

The purpose of the article is to research the chemical composition of modified polyamide waste agglomerate.

The objects of the research were:

- agglomerate polyamide 6 waste from polyamide clothing items, tights, socks, etc. (Material Wizard, Ukraine). Properties of agglomerate polyamide 6 waste: density 1,05 gr/sm³ and melt flow index (MFI) (230 °C, 2,16 kgs) – 2,56 gr/10 min;
- masterbatch for polyamides MW-PA CB10 (Material Wizard, Ukraine). MW-PA CB10 made on the polyamide basis and intended for effective coloring of cast polyamides 6, 66 and compositions based on them without reducing the strength properties;
- humic acid (HA), which were obtained by extraction of brown coal.

The study of impact strength and breaking stress during bending of modified polyamide 6 waste agglomerate of, without notching at a temperature 20 °C, was carried out on a pendulum head according to ISO 180 and ISO 178, respectively. Tensile strength and elongation at break of modified polyamide 6 waste agglomerate were carried out using breaking machine PM-200M according to ISO 527-2:2012.

Due to the modification of polyamide-6 waste ag-glomerate by HA there is an increase in strength properties with the optimal content of HS in polyamide-6 waste agglomerate -HA system is 0,5 % mas. of HA. Further, the systems polyamide-6 waste agglomerate -HA-MW-PA CB10 masterbatch were studied at the optimal content of HS at the level of 0,5 % mas. and variable content of MW-PA CB10 masterbatch 2 – 5 % mas. It can be seen that the modification of polyamide-6 waste agglomerate-HA system in the range of MW-PA CB10 content of 2 – 3,5 wt %. allows to significantly improve most of its strength properties. With a further increase in the content of MW-PA CB10, a decrease in the level of impact strength, tensile strength and elongation at break is observed.