Double stimuli responsive shape memory blends for packaging and biomedical sector

KEYWORDS

Materials
Shape Memory blends
Three-component system
Double stimuli response

PATENT

Double stimuli responsive shape memory blends

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LICENSING

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PROBLEM

Several molecular structures can show chemically or physically shape memory behavior such as interpenetrating polymer networks (IPN), hydrogels, semicrystalline polyurethanes, blends, etc.

In that sense, shape-memory polymers (SMP) are stimulus-responsive materials able to change their shape by applying an external stimulus, such as temperature, light, humidity, pH, electric or magnetic field, etc.

SOLUTION

The invention relates to a biodegradable double stimuli responsive shape memory blends based on crosslinked three-component system :

- A first polymer consisting of ethylene-co-vinyl acetate (EVA) with a proportion of vinyl acetate that ranges between 10% and 50% by weight of the total weight;
- A second polymer consisting of a thermoplastic starch (TPS); and
- A crosslinking agent consisting in an organic peroxide compound (DCP)

In particular, this three-component system is able to present **double stimuli responsive shape** memory properties, such as **thermally-activated and humidity-activated** shape memory behavior.

INNOVATION

- Novel combination of materials
- Double stimuli responsive
- Biodegradable
- Easily scalable using melt-techniques

TECHNOLOGY STATUS

- TRL 3-4

MARKETS

- **Packaging :** Flexible packages adaptable to the content and 100% biodegradable
- **Biomedical :** particularly for implantable medical devices where there is a need for materials mimicking human soft tissue

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