Double stimuli responsive shape memory blends for packaging and biomedical sector

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.

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.

**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