

4D PRINTING OF STIMULI-RESPONSIVE AND SHAPE MEMORY POLYMERS USING THE FFF TECHNOLOGY

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In the last few years four-dimensional (4D) printing technologies have attained growing worldwide interest and they are considered the "next big thing". The aim of this presentation is to provide three examples of stimuli-responsive polymer (SRP) applications additively manufactured (AM) by the fused filament fabrication (FFF) technique and two examples of PLA based shape memory polymer (SMP) applications. A CCT BLUE filament of thermo-responsive polymer was chosen to produce a water temperature indicator, which changes the color when the temperature is increased; a CCU RED filament of photo-responsive polymer was used to produce a sunlight / UV indicator bracelet; a transparent PLA CLEAR polymer, a CCU RED photo-responsive polymer, and an electrically conductive PLA polymer were selected to produce a business card stand. A PLA based filament of eSUN SMP was used to print two preliminary applications: a spring and a vase. We trust that these examples will help to increase the interest in FFF 4D printed stimuli-responsive polymers and shape memory polymers possible applications. Much R&D remains to be done in designing the objects and develop the FFF printing parameters taking advantage of SRPs and SMPs being developed for this technology.

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