

PhD position (#2/2)

Title: Shape memory polymers (SMP)

Character: Experimental

Context

The shape memory effect is the ability to vary the shape due to the application of an external stimulus. Therefore, a shape memory material is a material capable of recovering its original shape, i.e. a material able to remember its original shape. This provides these materials great scientific interest for its applicability in many different fields. The present study is focused on the synthesis and characterization of crosslinked semicrystalline polymers, more particularly polyolefins, with shape memory properties. This involves the control of both the polymer synthesis and the relationship between molecular structure and shape memory capability. The aim of this project is to analyze the influence of different factors, such as molecular weight and its distribution, molecular architecture, crosslinking method, on the shape memory properties of the polymer. The ultimate goal is to transfer the acquired knowledge to industry.

Tasks

The tasks are focused on expanding the range of polymeric materials susceptible to present shape memory properties. To do this, first polymers and copolymers based on polyolefins will be synthesized and characterized (morphological, structural, thermal and mechanically) and later their shape memory properties will be studied. This project tries: 1) to control the synthesis of polymers with tailored sizes and functionalities from different alkenamers (cyclooctene, cyclododecene, norbornene) and its derivatives; 2) to determine the ability of shape memory material; 3) to determine the relationship between the shape memory capacity and the polymer molecular structure and 4) to verify the possibility of obtaining products with commercially viable applications. Extrusion and pressing techniques will be used to obtain these polymers, and then they will be characterized by different techniques, as Differential Scanning Calorimetry (DSC), thermogravimetry (TGA), Dynamic Mechanical Thermal Analysis (DMTA), Infrared Spectroscopy Fourier Transform (FTIR) and Nuclear Magnetic Resonance (NMR).

Requirements

A Master on Materials Science, Polymer Science and Technology or similar is required. Candidates without a Master can also apply, provided they have been accepted into the Master on New Materials of the University of the Basque Country (UPV/EHU).

Application

Send a CV, motivation letter and two references to jobs@bcmaterials.net

Dead line: August 15th, 2012, 24:00 h GMT