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Title: Investigation of Shape Memory Alloys, Polymers and Gum Metals for Biomedical Applications

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In order to contribute to solving the problem of aging society, development of high performance biocompatible materials having various functions in changing conditions is required. To this class of materials belong: TiNi shape memory alloy (SMA), polyurethane shape memory polymer (PU-SMP) and new multifunctional titanium alloy, developed in Japan in the beginning of the 21st century, characterized by flexibility of rubber and strength of metal, called Gum Metal. Effects of shape memory of SMA and SMP, as well as high elastic properties and low Young modulus similar to human bone observed in Gum Metal, can be employed in innovative ways as actuating or sensing elements in many nowadays biomedical application; e.g. cardiovascular stents, flexible guidewires and orthodontic braces. The SMA and SMP unique properties are related to their structural changes, occurring at various temperature. The strong thermomechanical coupling and the related high thermosensitivity are observed in this materials during their loading and deformation. The aim of the research is investigation of the materials mechanical properties and effects of thermomechanical couplings. To this end, high quality MTS Testing Machine and fast and sensitive Flir Co Phoenix Infrared System has been used. Acknowledgments: The research has been carried out with the support of the Polish National Centre of Science under Grant No. 2014/13/B/ST8/04280.

Prof. Elzbieta A. Pieczyska has earned her Ph.D. and D.Sc. from Institute of Fundamental Technological Research, Polish Academy of Sciences and held postdoctoral position at AICHI Institute of Technology, JAPAN; supported by Japanese Society for Promotion of Science. She is working on mechanical and thermomechanical properties of smart multifunctional materials: shape memory alloys, polymers, composites and gum metals. She is nominated member of EuraSEM, ICEM Scientific Committee and other organizations, also serving as Head of the Warsaw Division of the Polish Society for Theoretical and Applied Mechanics. She has published over 33 papers in JCR list, 3 books and 3 book chapters.