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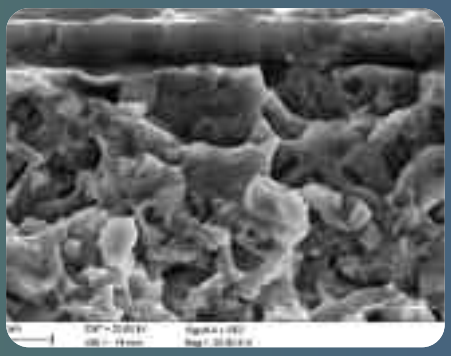
Selected materialographical photo



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Author: G. Matula in the paper entitled "Study on steel matrix composites with (Ti,Al)N gradient PVD coatings" on a **page 79** presents investigation results of structure and properties of steel matrix composites (SMC) uncoated and coated with hard (Ti,Al)N gradient coatings with use of physical vapour deposition process. Depositing of gradient (Ti,Al)N coatings onto SMC materials meets the requirements connected with hybrid technology of production, joining powder metallurgy and physical vapour deposition techniques, in area of producing modern composite gradient tool materials. Sintered steel matrix composites reinforced with hard carbide phases and deposited with gradient PVD coatings can be widely employed in industry for tools, especially for machining and plastic forming processes. Modern methods of powders' forming application make possible to achieve gradient structure of tool, which is very advantageous in respect of mechanical properties.

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The paper entitled "Long-time stability of shape memory actuators for pedestrian safety system" by J. Strittmatter, P. Gümpel and H. Zhigang on a **page 23** demonstrates the pedestrian safety systems play an increasing significant role to reduce injuries and fatal casualties caused by accidents. One automotive safety system for pedestrian protection is the bonnet lifting system. Using shape memory alloys (SMA) the existing systems could be simplified, performing the same function through new mechanisms with reduced size, weight and costs. A drawback for the use of SMA in such safety systems is the lack of material knowledge concerning the durability of the switching function. This paper gives an introduction to existing bonnet lifting systems for pedestrian protection, describes the use of quick changing SM actuators and presents the testing facilities and some results of the study concerning the long-time stability of the tested NiTi-wires. It can be concluded that the use of quick changing SM actuators in safety systems could simplify the mechanism, reduce maintenance and manufacture cost and should be insertable also for other automotive applications. For future works it is suggested that more NiTi-specimens at longer ageing periods should be tested, stress should also be applied by a constant load and the functional testing plant should be further optimised. This paper gives some answers concerning the long-time stability of NiTi-wires that were missing till now. With this knowledge the number of future automotive applications using SMA can be increased.

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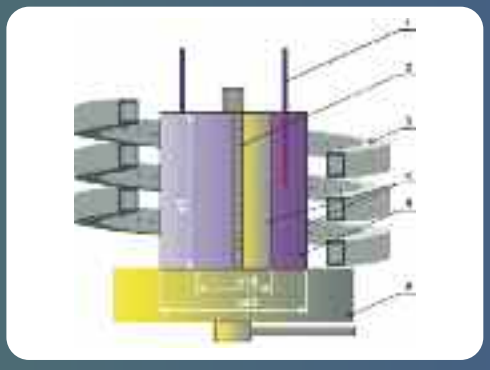
The Materials section represented by G. Wróbel, J. Kaczmarczyk, J. Stabik and M. Rojek on "Numerical models of polymeric composite to simulate fatigue and ageing processes" on a **page 31** presents the possibility of applying numeric model of polymer composite, consisting of finite elements, to simulate dynamic acoustic and thermal processes. Characteristics of these processes evaluated numerically, in comparison with experimental results, could allow to simulate complex structural processes taking place during fatigue and ageing degradation of composite. It is expected to prove relations between chosen physical properties of simulated processes and strength characteristics determining load capacity of materials. Complete identification of numerical model characteristics and procedure of its modification is expected to allow to estimate the degree of strength properties degradation on the basis of numerical simulations results. The possibility of model structural and parametric modifications resulting in changes of composite physical properties, such as stiffness, acoustic wave propagation velocity and thermal conductivity, observed during degradation processes was demonstrated.



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In the research paper entitled "Structure investigation of the Al-Si-Cu alloy using derivative thermo analysis" by M. Krupiński, K. Labisz and L.A. Dobrzański on a **page 47** the investigation results of derivative thermoanalysis performed using the UMSA device (Universal Metallurgical Simulator and Analyzer) are presented. As a result of this research the cooling rate influence on structure and mechanical properties changes, especially HB Hardness was investigated. The cooling rate was set in a variable range of ~0,2°C/s to ~1,25°C/s. In this work structure changes were determined concerning the structure, especially the dendrites and grains and particle distribution in the aluminium matrix. This work provides also a better understanding of the thermal characteristics and processes occurred in the new developed near eutectic Al-Si-Cu alloy. The achieved results can be used for liquid metal processing in science and industry and obtaining of a required alloy microstructure and properties influenced by a proper production conditions.

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