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# ABSTRACTS BOOK

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# ABSTRACTS

## STUDY ON A NEW-TYPE THERMAL STORAGE AERATED CONCRETE

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**Abstract**

In this study, the Paraffin/Silicon dioxide phase change materials PCM was mixed into the aerated concrete to prepare thermal storage aerated concrete. The thermal performance, compressive strength, dry density and thermal conductivity were measured. The microstructure of the thermal storage aerated concrete was observed with a Scanning Electron Microscope. The results showed that the compressive strength of the thermal storage aerated concrete was decreased with the increase of the amount of the composite PCM. The existence of composite PCMs makes the crystallinity of the tobermorite decreased. The aerated concrete with the composite PCM shows notable thermal storage performance.

Keywords: Aerated concrete; Phase change material; Thermal storage; Energy saving

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# THE EFFECT of ULTRASOUND on The CRYSTALLIZATION PROCESSES of NAPROXENE SODIUM

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**Abstract**
This study focuses on polymorphism and crystal size distribution in the crystallization process of naproxen sodium (Nap.Na) with parameters of ultrasonic power intensity (related to Amplitude) and expose time at which the ultrasound is applied (sonication time).Application of ultrasonic energy with various amplitudes and expose times can lead to change in the crystalline structure of naproxen sodium. The zeta potential of the suspensions were in the range of -35.80 and -60.33mV. The presence of these negative charges on the surface of the agglomerates kept the agglomerates in a different shape when different sonication time and amplitudes used. The % cumulative dissolution release of sample with 5 minutes and 70% amplitude was found to be nearly 1.6 times higher than that of the unsonicated simple. This higher value may be due to the increased surface area and reduction in crystallinity. We used different characterization tools to understand the role that ultrasound amplitude and expose times play in the crystallization process of Nap.Na.These tools are scanning electron microscopy (SEM), X-Ray diffraction (XRD), Differential Scanning Calorimetry (DSC) and Fourier transform infrared spectroscopy (FT-IR).

Keywords**:** Crystallization, Various Amplitudes, Ultrasound Is Applied

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# THERMAL TREATMENT IN AIR OF D.C. MAGNETRON SPUTTERED TIN COATINGS

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**Abstract**

TiN coatings were deposited on polished stainless steel substrates by reactive d.c. magnetron sputtering using a Ti target and $Ar/N_2$ atmosphere. The TiN coatings were thermally treated in ambient air at temperatures between 773 and 973 Kelvin for times between 1 and 16 hours. As-deposited and thermally treated coatings were characterized using GD-OES, XRD and SEM. Titanium oxide layers were identified at the surface of thermally treated TiN coatings, which grow according to oxygen diffusion controlled parabolic time law. Phase composition of the oxide layers, as deduced by XRD, is found to depend strongly on temperature and reaction time. At low temperatures and shorter reaction times the oxide layers were found to be a mixture of anatase and rutile polymorphs of $TiO_2$, while at high temperatures and longer reaction times the oxide layers consisted only of the rutile polymorph of $TiO_2$. SEM results show that the microstructure of the oxide layers is porous and non-uniform across the oxide layer thickness. Porous microstructure is explained by accumulation of nitrogen by short-range diffusion and transition into gaseous state.

Keywords: TiN, Magnetron sputtering, Oxide layer, XRD;

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# PRODUCTION AND CHARACTERIZATION OF HIGH THERMAL RESISTANT TALC-REINFORCED POLYPROPYLENE (PP) FIBERS AND YARNS

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**Abstract**

Polypropylene (PP), a thermoplastic polymer, is the world's second most common raw material and widely used in the textile and plastics industries. Fibers, fibrous and other PP-based textile materials are mainly used in the application areas of carpets, underlays, rugs, hygiene textile products, tapes, ropes, clothing, geotextiles, technical textiles (e.g. filter and separation materials for automobile industry) and textiles for medicine. PP fibers are preferred in the textile industry because of their low cost and easy process ability, low-density, high strength and excellent chemical resistance.Increase in the application areas of textiles resulted in need of improved and additionalproperties and functions, which should to be provided by the polymers with differentfunctionalities or the additions of the particles to the fibers. Therefore, in recent times,research on the properties of textile fibers has been increased progressively.The main motivation of the selection of talc as fillermaterial is to improve the thermal shock resistance and decrease the shrinkage ofpolypropylene (PP) fibers and yarns.

Keywords: Areas Of Textiles Resulted, Properties Of Textile Fibers

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# CHARACTERIZATION OF STRENGTH DISTRIBUTION OF DENTAL CERAMICS WITH DIFFERENT MICROSTRUCTURES AND SURFACE TREATMENTS

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## Abstract

The Weibull distribution is the most widely used function in the reliability analysis and structural design of dental ceramics; however, it is still unclear whether Weibull distribution is always the most suitable function for fitting the strength data of dental ceramics with different surface treatments and microstructures. With wide applications of dental ceramics, a special attention has been paid indiscriminating their strength distributions. In this study, three versatile functions, involving normal, log-normal and Weibull distributions, areapplied to the analysis of strength data sets of dental ceramics with different compositions and different surface treatments are analysed. It isshown that the type of surface treatment has an important influence on deviation of strength distribution from perfect Weibullstatistics. It is concluded that estimation of the most suitable statistical model for Vita VMK 68 is not only a material-dependentbut also a process-dependent (machining of the specimens) procedure.It is shown that microstructures andcompositions may affect the strength distribution of dentalceramics. The effects of microstructure induced fracturebehaviors (i.e., R-curve, SCG, and multi-modal flaw distribution)on deviations from the Weibull distribution are explainedand discussed by using the experimentally measured strengthdata. There is no sufficient evidence that the Weibulldistribution is always preferable to other distribution functionsin fitting strength data of dental ceramics. As a result, the use ofthe Weibull distribution for the characterization of strengthshould be questioned and tested prior to the design of dentalceramics. Similar to strength data, the size and shape of grainsand defects are equally important in determining themechanical properties of materials.

Keywords: most suitable statistical, mechanical properties

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# REPAIR DEFORMATION OF DUAL-PHASE AUTOMOTIVE STEELS

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**Abstract**

Dual phase steels are widely used in modern automotive industry for load-bearing parts, responsible for passive safety. The problems of elastic-plastic behavior of these steels conditioned by the fact that the strength characteristics of the material depends on all previous strain and temperature effects from the date of production. To investigate folds formation mechanism and properties of steel during heating in reverse deformations were used two-phase steel DP780 and DP980 samples. Reverse loading (compression-tension) was conducted on a universal tensile testing machine MTS 810 with devices for fixing the sample from buckling under compression and for heating the sample during the test. The elongation of samples was recorded by laser extensometer LE-05. The samples were prepared in accordance with ASTM -E08 standard. The possibility of plastic deformation restoration was investigated implemented to the car bodies produced from dual-phase steels. Damage classification based on ability to restore passive safety and integrity features was proposed. The dependence for local heating temperature determination was experimentally created for dual-phase steel DP780. The ability to recover two-phase steel deformation is of particular interest due to the lack of similar materials repair experience and the growing volume of usage in the automotive industry.

Keywords: dual-phase steel, car body repair, repair deformation

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# PRODUCTION OF METAL MATRIX COMPOSITES BY IN-SITU TECHNIQUES

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**Abstract**

Composite, consisting of matrix and reinforcement phases is the material obtained by joining of at least two engineering materials. Reinforcement components are generally supplied into the liquid matrix externally. This method is termed 'ex-situ'. There are some disadvantages of this method on microstructures of composites. Agglomeration of the reinforcement components, non-homogenous microstructure and risk of breakage of ceramic particles with high hardness are some of them. However, the reinforcement elements can be synthesized through chemical reactions that occur within the molten matrix. Higher strength composites can be obtained by technique called as 'in-situ'. This synthesis technique include exothermic dispersion (XD), mechanical alloying (MA) and reactive hot pressing (RHP). In the current study, it is mentioned properties of metal matrix composites produced by different methods.

Keywords:in-situ,metal matrix composites, reinforcement elements

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# STRESS ANALYSESE IN AN ELASTIC BODY WITH A LOCALLY CURVED AND HOLLOW FIBER

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**Abstract**

Within the framework of the piecewise homogenous body model, with the use of the three-dimensional geometrically nonlinear exact equations of the theory of elasticity, the method developed for the determination of the stress distribution in the composites with unidirectional locally curved and hollow fibers is used for investigation of the normal stresses acting along the fibers. All the investigations are carried out for an infinite elastic body containing a single locally curved and hollow fiber. It is assumed that the consider material is loaded at infinity by uniformly distributed normal forces in the fiber lying direction. Under formulation and mathematical solution of the boundary value problem the boundary form perturbation method is used. The numerical results related to stress distribution in considered body and the influence of geometrical nonlinearity to this distribution are presented and interpreted.

Keywords:Locally curved fiber, hollow fiber, the normal stresses

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