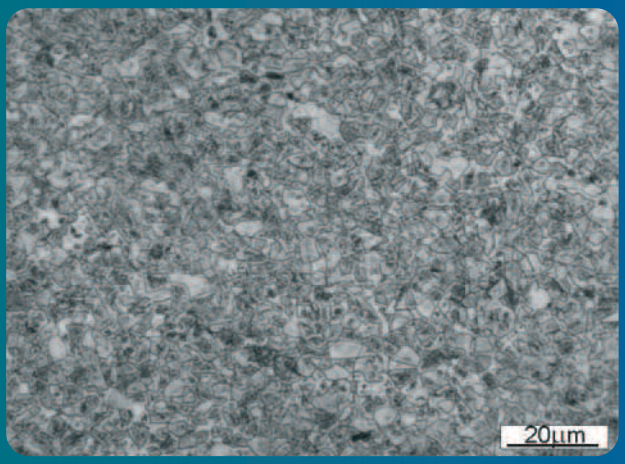
Materials

Properties



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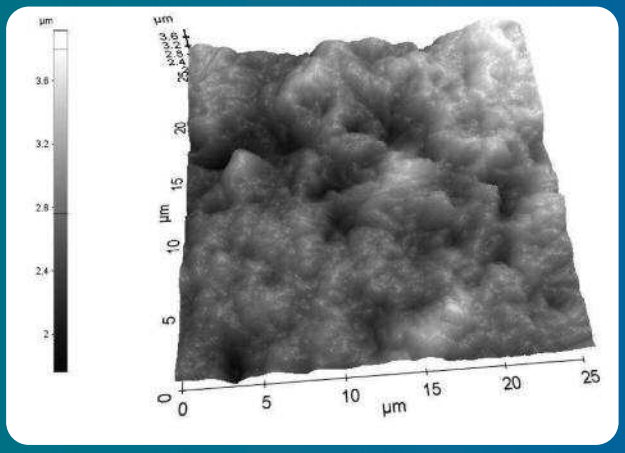
R. Dąbrowski on a **page 7** in paper "The phase transformations during continuous cooling of Ti6Al7Nb alloy from the two-phase α+β range" deals with the phase transformations during continuous cooling from the two-phase α+β range in Ti6Al7Nb alloy. The relationship between cooling rate and microstructure morphology, hardness as well as dilatation effects has been determined. The analysis of phase transformations and changes occurring in the microstructure of the two-phase titanium Ti6Al7Nb alloy at a continuous cooling from the two-phase α+β range are carried out. These analyses are performed for the selected cooling rates, from a range: 25÷0.05°C/s, for which the detailed metallographic documentation of microstructures and hardness measurements results are given. The obtained results, supported in the future by additional cooling curves, will be used for the development of the original, full CCT diagram of the Ti6Al7Nb alloy cooled continuously from the two-phase α+β range.



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On a **page 13** L.A. Dobrzański, M. Szindler in paper "Al_2O_3 antireflection coatings for silicon solar cells" investigate changes in surface morphology and optical properties of thin films of Al_2O_3 prepared using atomic layer deposition (ALD) method. The microanalysis was investigated by the Energy-dispersive X-ray spectroscopy EDS. The changes in surface topography was observed by the atomic force microscope AFM XE-100 and scanning electron microscope SEM. The results of roughness were prepared in the software XEI Park Systems. The measurement of thickness and dispersion of refractive index was performed using SE800 PV spectroscopic ellipsometer. The optical reflection was investigated by the spectrometer UV/VIS. Results and their analysis allow to conclude that the atomic layer deposition method enables uniform coating of smooth and complicated shapes surfaces. The thin film thickness depends only on the number of cycles, so that can be easily control the thickness of the material. Knowledge about the ALD Al_2O_3 optical parameters and the possibility to obtain a uniform thin films show that the previously named material has a big potential in photovoltaic application.

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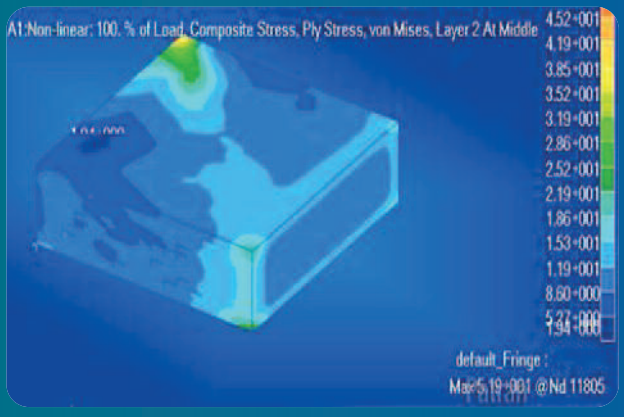
In the paper entitled "Plastic properties of weld after micro-jet cooling" J. Piwnik, D. Hadryś, G. Skorulski on a **page 20** analyze main plastic properties of welds made by MIG method with micro-jet cooling. They investigate possibilities of obtaining better plastic properties for those welds than welds made by ordinary welding method. During research Erichsen cupping tests and bending tests were carried out for welds made by MIG method with micro-jet cooling and ordinary welding method. High amount of acicular ferrite influences positively on plastic properties. MIG method with micro-jet cooling is a way to get better plastic properties of welds in relation to welds made by ordinary welding method. It is very important because it could be used to steering of mechanical properties of welded constructions. A new method of welding is very promising and capable of industrial application, mainly due to the significant improvement of weld properties and quality.



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The properties section represented by M. Szymiczek, G. Wróbel, M. Rojek, T. Czapla on "Simulation diagnostics of the polyester-glass pipes degradation process; experimental basis" on a **page 37** describes the method that enables identification of controller of simulation procedures which ensures compliance of experimental research results of changes in material physical characteristics with the characteristics of the numerical model. Within the work the basis for experimental research conducted in order to identify the parameters and drivers of diagnostics simulation procedure of polyester/glass pipes in fatigue-ageing conditions was presented. The purpose is developing the tool of virtual diagnostics simulation which enables the assessment of the degree of exhaustion of carrying capacity of composite pipes in condition of numerical models research. The key of achieving the durability assessment or residual strength of composite elements is the pointed possibility of their calculation on the basis of correctly built model. The basis of assessment in numerical model provides the strength analysis of the model generated with the use of developed simulation procedure taking into account the history or prognosis of the exploitation programme of a composite element. The reliability of the model is increased by compliance of coupled strength, acoustic and thermal properties. The acoustic and thermal characteristics, as independent tools of correctness verification of the model, enable the simulation, for example, processes of acoustic wave propagation of thermal process reflecting the virtual diagnostic processes. The characteristics of these processes provide the independent basis for assessment of material condition with the use of appropriate diagnostics relation of residual strength Rm(N) as well as the speed of acoustic wave propagation of proper thermal properties (thermal conductivity, diffusivity).

Analysis and modelling