



Materials

59. Applications of lasers in metallization of thermoplastic and thermosetting polymers
P. Rytlewski, M. Żenkiewicz (Poland)

68. Austenitic steels for boiler elements in USC power plants
A. Zieliński (Poland)

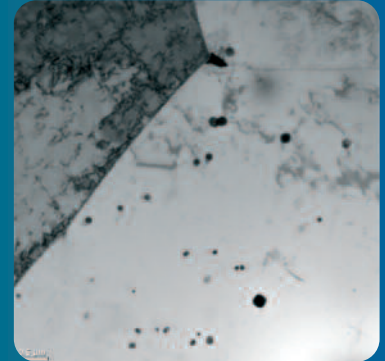


Properties

76. Application of Taguchi design method to optimize the electrical discharge machining
D.C. Chen, J.J. Jhang, M.W. Guo (Taiwan)

83. Influence the heat treatment of two base metal alloys used on dental prosthesis on corrosion resistance
Ł. Reimann, L.A. Dobrzański, B. Nieradka (Poland),
M. Kusy, R. Riedlmajer (Slovakia)

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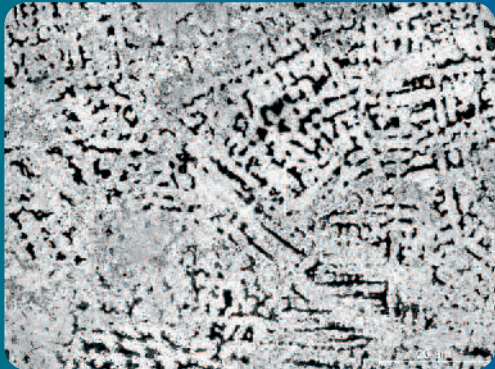


The Materials section represented by A. Zieliński on "Austenitic steels for boiler elements in USC power plants" on a **page 68** describes the characteristics of functional properties of austenitic-based steels used for construction of boilers with supercritical and ultra-supercritical steam parameters. For selected austenitic steels in as-received state and after long-term annealing microstructural investigations were carried out with a scanning and a transmission electron microscope. Selected characteristics of structure and functional properties of materials to be used for critical elements in the pressure section of power boilers were summarised in a single paper. The steel characteristics presented in this paper are used for assessment of structural changes and changes in strength properties of material of elements after long-term service under creep conditions. The presented results of the mechanical properties, structure and in the precipitation processes are applied to the evaluation of the condition of the elements in further industrial service.



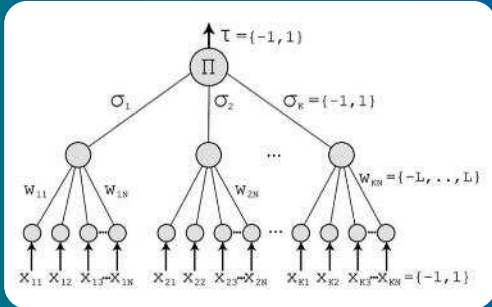
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In the paper entitled "Application of Taguchi design method to optimize the electrical discharge machining" by D.C. Chen, J.J. Jhang and M.W. Guo on a **page 76** the current study utilizes the Taguchi design methodology to optimize the EDM processing parameters for the machining of A6061-T6 aluminum alloy was presented. The experimental trials consider four EDM parameters, namely the pulse current (PC), the pulse-on duration (ON), the duty cycle (DC), and the machining duration (MD). The machined specimens are observed using the surface roughness is measured using a commercial profilometer. The optimal machining parameters and the relative influence of each parameter on the surface roughness are determined by analyzing the experimental data using the analysis of means (ANOM) and an analysis of variance (ANOVA) techniques. It is inferred that the optimal machining parameters established using the Taguchi design methodology have a good general applicability to the EDM machining of both aluminum and brass alloys. The results show that the magnitude of the surface roughness is determined primarily by the pulse current (PC) and duty cycle (DC) parameters. A CuZn40 brass alloy specimen is machined using the optimal processing parameters and is found to have a lower mean surface roughness than the A6061-T6 workpiece. The general applicability of the optimal machining parameters is investigated by machining a CuZn40 alloy specimen under the optimal conditions and then comparing the surface roughness characteristics of the machined surface with those of the A6061-T6 specimen.



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Authors: Ł. Reimann, L.A. Dobrzański, B. Nieradka, M. Kusy and R. Riedlmajer in the paper entitled "Influence the heat treatment of two base metal alloys used on dental prosthesis on corrosion resistance" on a **page 83** try to find the influence of the heat treatment on the corrosion resistance of two base cobalt alloys used on dental prosthesis. Two base cobalt alloys: Remanium 2000+ (Dentaurum) and Wirobond LFC (Bego) were chosen for the investigation. Corrosion resistance test were carried out at room temperature and with the use of the Potentiostat IPS AJ PGU system for electrochemical tests. The examination use of water centre which simulated artificial saliva environment. The evaluation of pitting corrosion was realized by recording of anodic polarization curves with use the potentiodynamic methods. Structure observation was made after surface preparation by a light microscope. The research was carried out on samples, not on final elements. The research material is used on dentures, so it must characterize the corrosion resistance. Results of this work make up an information on what heat treatment parameters attention for two base cobalt alloys: Remanium 2000+ (Dentaurum) and Wirobond LFC (Bego) may be paid. The paper presents influence of the heat treatment of two base metal alloys used on dental prosthesis on corrosion resistance.



91 The Analysis and modelling area is shown in the paper on "The evaluation of the TPM synchronization on the basis of their outputs" by M. Dolecki, R. Kozera and K. Lenik on a **page 91**. Tree Parity Machines are specific artificial neural networks used to construct relatively secure key exchange protocol. The level of networks' compatibility is measured by weight vectors mutual overlap. However, to calculate such a mutual overlap, one needs to be familiar with both weights' vectors, which is impossible in practical key exchange. This paper discusses other schemes to evaluate compatibility of weights' vectors. The first one uses Euclidean distance of both weights' vectors. The second one is based on frequencies of common TPM's outputs and as such does not rely on the weights' vectors. Both approaches to handle secure key exchange protocol facilitate more extended analysis of many technical processes in which a vital role plays an incorporation of a non-standard high-quality method securing any sensitive data. We found experimentally that mutual overlap of the weights' vectors is highly correlated with Euclidean distance. Additionally, frequencies of common outputs in given numbers of learning cycles stay in high correlation with this mutual overlap and Euclidean distance. The latter can subsequently be used to draw pertinent conclusions about TPM's weights compatibility. Proposed methods, especially frequencies analysis, can be applied to key exchange protocol to improve its security. Determining the vectors, compatibility level before synchronization completion allows qualifying this synchronization to one of the possible time classes. New ideas presented in this work involve application of Euclidean distance and common output frequencies to calculate the networks compatibility given by weights mutual overlap.



Analysis and modelling

91. The evaluation of the TPM synchronization on the basis of their outputs

M. Dolecki, R. Kozera, K. Lenik (Poland)

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