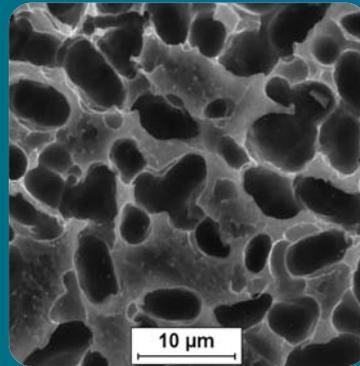




Materials

- 115. Designing of cooling conditions for Si-Al microalloyed TRIP steel on the basis of DCCT diagrams
A. Grajcar, W. Zalecki, R. Kuziak (Poland)
- 125. The preparation of aramid fibres in silicone based composite materials
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- 132. Corrosion resistance of AZ31 alloy after plastic working in NaCl solutions
W. Walke, J. Przondziono, E. Hadasik, J. Szala, D. Kuc (Poland)



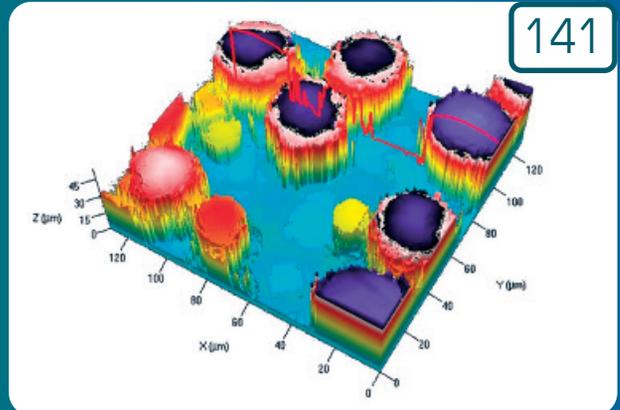
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The Materials section represented by W. Walke, J. Przondziono, E. Hadasik, J. Szala and D. Kuc on "Corrosion resistance of AZ31 alloy after plastic working in NaCl solutions" on a **page 132** presents the evaluation of resistance to corrosion of magnesium alloy AZ31 after rolling. Literature gives the results of corrosion tests with reference to cast alloy AZ31. Tests of corrosion resistance of hot rolled AZ31 in chloride solutions were made for the first time. Corrosion tests were carried out in NaCl solutions featuring various concentration of chloride ions (0,01-2,00 M NaCl). Potentiodynamic tests enabled to register anodic polarisation curves. Stern method was applied to determine parameters of corrosion resistance of the alloy. Resistance to electrochemical corrosion was evaluated on the ground of registered anodic polarisation curves by means of potentiodynamic method. Immersion tests were carried out in NaCl solutions in the time of 1-5 days. A main conclusion of presented work authors state that irrespective of molar concentration of NaCl solution, pitting corrosion was presented in the tested alloy. It proves the lack of resistance of magnesium alloy AZ31 after plastic forming to such corrosion type. Test results prove that protective coating on elements made of the tested alloy is necessary.



Properties

- 141. Structure and electrical properties of screen printed contacts on silicon solar cells
L.A. Dobrzański, M. Musztyfaga, A. Drygała, W. Kwaśny, P. Panek (Poland)
- 148. The structure and mechanical properties of Al-Mg-Mn alloys shaped in the process of thermo-mechanical treatment
W. Ozgowicz, E. Kalinowska-Ozgowicz, A. Kowalski, K. Gołombek (Poland)
- 157. The corrosion resistance of zinc-nickel composite coatings
J. Panek, B. Bierska-Piech, M. Karolus (Poland)



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In the paper entitled "Structure and electrical properties of screen printed contacts on silicon solar cells" by L.A. Dobrzański, M. Musztyfaga, A. Drygała, W. Kwaśny and P. Panek on a **page 141** the possibilities of applying a conventional method - "screen printing" using micrometric pastes to improve the quality of forming front side metallization of monocrystalline solar cells are introduced. The topography of co-fired in the infrared belt furnace front contacts were investigated using confocal laser scanning microscope and scanning electron microscope with an energy dispersive X-ray (EDS) spectrometer for microchemical analysis. There were researched both surface topography and cross section of front contacts using SEM microscope. Phase composition analyses of chosen front contacts were done using the XRD method. Front contacts were formed on the surface with different morphology of the solar cells: textured with coated antireflection layer, textured without coated antireflection layer, non-textured with coated antireflection layer, non-textured without coated antireflection layer. The medium size of the pyramids was measured using the atomic force microscope (AFM). Resistance of front electrodes was investigated using Transmission Line Model (TLM). Based on electrical properties investigations using TLM method, it was found out that in the temperature range of 860±945°C, the specific contact resistance of testing structure co-fired from the K1 paste is equalled 0.44±57.21 Ω·cm² onto substrate having different surface morphology of silicon solar cells. Electric measurements and metallographic observations confirmed that both lack of ceramic glaze and too grate content of organic carrier into paste composition are responsible for stability value of obtained results.



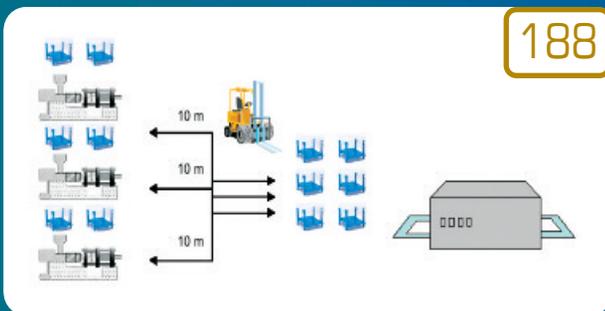
Analysis and modelling

- 163. Modeling of coal in a railway coach
A. Baier, M. Majzner (Poland)



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The paper entitled "Modeling of coal in a railway coach" by A Baier and M. Majzner on a **page 163** presents the results of researches focused on identifying the forces acting on the structural elements of railway wagons. It is a part of research dealing with the use of composites in the repair and construction of new structural elements of railway wagon. The main tool of verification of the research was Siemens PLM Software NX 7.5. Motion simulation was carried out in one module of the software, Motion Simulation. Connections between components were made using constraints and connections mapping the real relationship between components. Computer simulation shows the real movement of the railway wagon on the track. Such phenomena as tubing, detachment of the wheels on the rails of the wagon slipped off the track were observed during the motion of the actual object. Computer analysis allowed for the identification of the forces acting on structural elements of the wagon train. The results of motion study (the forces and dynamic phenomena) are the input data to research on the use of composite materials (laminates) in the repair and construction of new component parts and components of railway wagons.



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The paper written by Š. Valčuha, A. Goti, J. Úradníček and I. Navarro on "Multi-equipment condition based maintenance optimization by multi-objective genetic algorithm" on a **page 188** deals with the optimization of the condition based maintenance (CBM) applied on manufacturing multi-equipment system under cost and benefit criteria. The system was modeled using Discrete Event Simulation (DES) and optimized by means of the application of a Multi-Objective Evolutionary Algorithm (MOEA). A paper provides a solution for the joint optimization of CBM strategies applied on several equipments. Precisely, the research is focused on the problem of CBM optimization in a manufacturing environment with the objective of determining the optimal component deterioration levels or thresholds when preventive maintenance (PM) is performed for multi-equipment systems under cost and profit criteria. The developed approach takes into account the sections interaction of production, work in process material, quality and maintenance aspects. For this purpose, a model that considers maintenance, productive speed loss and non-quality costs along with productive profit was developed. The model was implemented using DES and optimized using a MOEA.

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