# Contents

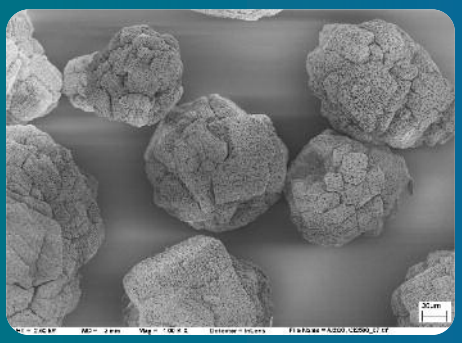
## Materials



## Properties



## Selected materialographical photo



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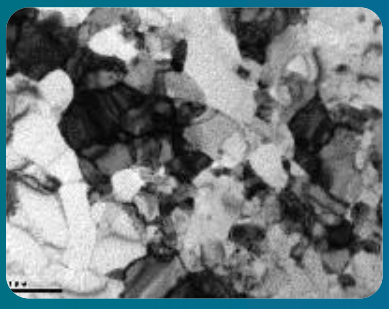
The research paper entitled "Structure and properties of ceramic preforms based on $Al_2O_3$ particles" by L.A. Dobrzański, M. Kremzer and A. Nagel on a **page 7** describes the method of manufacturing the porous, ceramic preforms based on $Al_2O_3$ particles used as the reinforcement in order to produce modern metal matrix composites by pressure infiltration method with liquid metal alloys. Ceramic preforms were manufactured by the sintering method of $Al_2O_3$ powder with addition of pore forming agent. The preform material consists of powder Alcoa $Al_2O_3$ CL 2500, however, as the forming factor of the structure of canals and pores inside the ceramic, agglomerated framework the carbon fibres Sigrafil C10 M250 UNS were used. The addition of carbon fibres was 30, 40 and 50% of weight. The TGA analysis of carbon fibres has been made. The investigations of the structure of powder $Al_2O_3$ Alcoa CL 2500, the used carbon fibres and the obtained ceramic preforms on the scanning electron microscope (SEM) have been made. The measurement of permeability of the obtained materials on the specially designed station has also been made. The manufactured ceramic preforms are widely used as the reinforcement to produce the composite materials by the infiltration method. That method allows manufacturing the metal elements locally reinforced and the near-net shape composite products.



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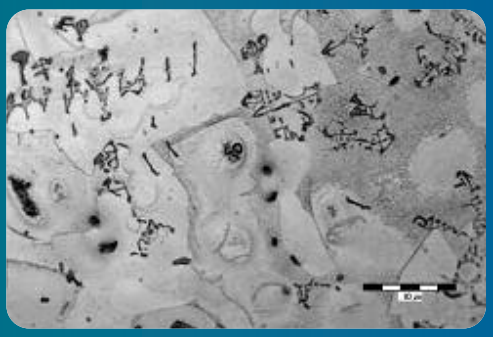
The paper written by S. Rusz, K. Malanik, J. Dutkiewicz, L. Čížek, I. Skotnicova and J. Hluchnik on "Influence of change of direction of deformation at ECAP technology on achieved UFG in AlMn1Cu alloy" on a **page 21** discusses a complex evaluation of aluminium alloy, which requires very often knowledge of behaviour of deformation at the ECAP process and achieved strengthening, intensity of deformation and very fine structure. These factors have influence on the mechanical properties and formability. Presented knowledge expresses very important information for exploitation of this alloy. The results may be utilized for determination of a relation between structure and properties of the investigated alloy in the process of manufacturing. These results contribute to complex evaluation of properties of the AlMn1Cu alloy, namely in the light of achievement of very fine – grained structures and corresponding mechanical and forming properties. The results of this paper are determined for research workers – in order to increase efficiency of the process of severe plastic deformation.



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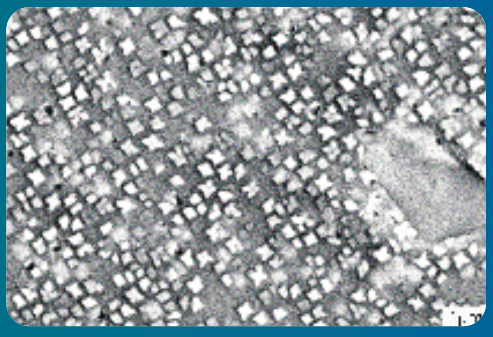
The paper entitled "Structure and mechanical properties of Mg-Si alloys at elevated temperatures" by L. Čížek, A. Hanus, O. Blahož, T. Tański and L.A. Dobrzański on a **page 37** shows the complex evaluation of magnesium alloys which requires very often knowledge of structure and mechanical properties at elevated temperatures. These properties are connected with microstructure that is influenced by metallurgical and technological factors and exploitation conditions. Presented knowledge expresses very important information for design and exploitation of these alloys. These results contribute to complex evaluation of magnesium alloys properties namely for explanation of structure developed new magnesium alloys. The results of this paper are determined for research workers dealing with the development of new exploitations of magnesium alloys. The results may be utilized for a relation between structure and properties of the investigated material in process of manufacturing.



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The paper from Properties area made by M. Zielińska, K. Kubiak and J. Sieniawski on "Surface modification, microstructure and mechanical properties of investment cast superalloy" on a **page 55** describes physical and chemical properties of cobalt aluminate ($CoAl_2O_4$) modifiers produced by different companies and the influence of different types of modifiers on the grain size, the microstructure and mechanical properties of high temperature creep resisting superalloy René 77. Modification of the face coat of ceramic mould results in the reduction of the grains size of γ matrix and disintegration of carbide precipitates. It results in the improvement of mechanical properties of the alloy. On the grounds of the obtained results, it was found that the type of used modifier influenced the grain size of the alloy and its mechanical properties. The established physical and chemical properties of modifier let to get better control of grain size of the castings and their quality what will result in decrease of defective products.

## Analysis and modelling



## Manufacturing and processing



## Industrial management and organisation



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