Materials

Properties

Methodology of research

Selected materialographical photo

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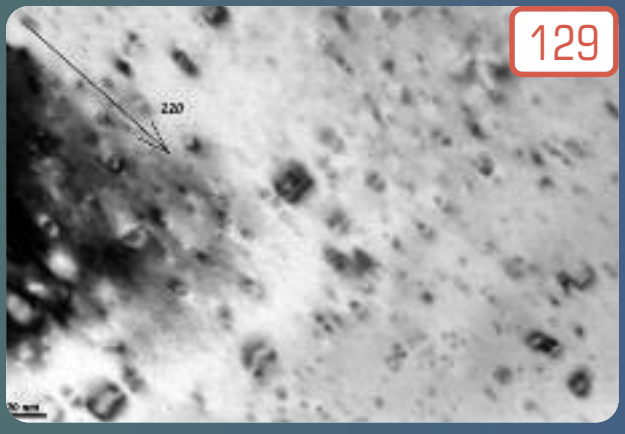
The paper from Manufacturing and processing area made by G. Matula on "Influence of binder composition on structure and properties of carbide alloyed composite manufactured with the PIM method" on a **page 193** informs that the goal of the project is to employ the injection moulding of the mix to be used for fabrication of the contemporary tool materials with the cermet structure. It was found out, based on the investigations carried out, that the powder injection moulding method is suitable for fabrication of the high-speed matrix cermet. Moreover, It was found out based on observations on the scanning microscope that the cermet structure is homogeneous with the evenly distributed carbide precipitations encompassing the high-speed steel primary grains. Introducing the WC, TiC, TaC, and NbC mix of carbides into M2 steel makes using higher sintering temperatures possible, therefore, a lower sinter porosity can be attained. Moreover, carbides with the regular lattice do not get dissolved in the matrix and do not create the eutectic structure at the high sintering temperature. The main advantage of the presented experimental tool materials is the wide sintering window being only about 5°C oftentimes in case of the high-speed steels; whereas, it is about 40°C for the investigated material.



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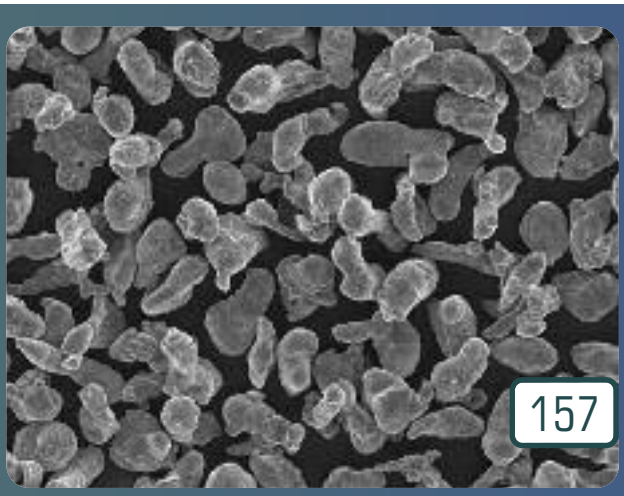
The Materials section represented by W. Głuchowski and Z. Rdzawski on "Stabilisation of mechanical properties in silver alloys by addition of La and Ce" on a **page 129** presents the investigation the mechanical properties stability of Ag-La (0,5%) and Ag-mishmetal (1 and 4%) alloys caused by severe plastic deformation compared to the Ag+(7,5 wt %)Cu alloy and pure Ag materials. Additive of rare earth metals contributed to fine structure obtaining, particles formed in grain boundaries stabilised microstructure at elevated temperature. Increase of mechanical properties of investigated alloys was connected with presence of fine precipitations in silver matrix, which confirmed susceptibility to precipitation hardening of silver – mishmetal alloys. Stability of mechanical properties at elevated temperature, gives possibility to use of new silver allays for producing elements designed to operate at elevated temperatures or exposed to rapid temperature changes. Increased mechanical properties and good tarnish resistance indicates possibility of new applications of investigated alloys in jewellery and medicine, after additional and essential investigations.



In the paper entitled "Mechanical and physical properties of sintered aluminum powders" presented by A.Gökçe and F. Fındık on a **page 157** the comparison of the physical and mechanical properties for argon atomized Al-1wt-%Mg powders with and without lubricant 1wt% Acrawac was specified. Pure nitrogen sintering was performed and the effect of sintering atmosphere for the mixed Al-1%Mg powder compacts – investigated. Residual macro- and microporosity was presented in all sintered samples under every sintering condition. Medium sized pores and small interconnected micro-pores at grain boundaries were visible when lubricant was added which reduced the sintered densities due to a wide burn off range leaving residual porosity. Green and theoretical density increased with the increment of compaction pressure. Although Acrawax lubricant provides a reasonable green density, it had a deleterious effect on sintered density mainly owing to its wide burn off range and hence incomplete removal during sintering leaving some black residue.

Authors: Z. Barlas and H. Uzun in the paper entitled "Microstructure and mechanical properties of friction stir butt welded dissimilar Cu/CuZn30 sheets" on a **page 182** present the feasibility for joining of dissimilar commercial pure copper sheet to brass (CuZn30) sheet by friction stir welding (FSW). In this study, dissimilar Cu and CuZn30 sheets was butt joined by FSW. It has been investigated microstructure properties, microhardness, tensile and bending tests, in order to evaluate the joint performance and the weld zone characteristics of dissimilar copper/brass (Cu/CuZn30) joints. This research is one of the preliminary studies on the detailed examinations of the microstructural and mechanical properties of the dissimilar Cu/CuZn joint by FSW. FSW is successfully applied to the butt joining of dissimilar Cu and CuZn30 alloy sheets.

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