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Editor-in-Chief Prof. Leszek A. Dobrzański

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by the World Academy of Materials
and Manufacturing Engineering

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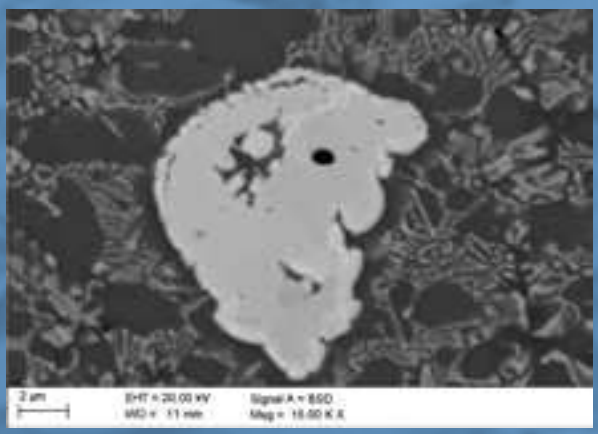
Professor
Leszek A. Dobrzanski M Dr hc
Editor-in-Chief of the AMSE
President of the WAMME
President of the ACMSSE

Dear Readers,
I am pleased to hand over to PT Readers the next issue of Archives of Materials Science and Engineering with the hope that the reading of papers contained in it will be interesting and invite PT authors to publish their works in next issues. I do recommend a scientific paper presented below.



The paper entitled "Formation of gradient surface layers on high speed steel by laser surface alloying process" by M. Bonek on a page 182 presents laser surface technologies, investigation of structure and properties of the high speed steel alloying with the WC, VC, TiC, SiC, Si_3N_4 and Al_2O_3 particles using high power diode laser HPDL. The purpose of this research paper is focused on the high speed steel HS6-5-3-8 surface layers improvement properties using HPDL laser. Investigation indicates the influence of the alloying elements on the structure and properties of the surface layer of investigated steel depending on the kind of alloying carbides, oxides, nitrides and power implemented laser (HPDL). Laser alloying of surface layer of investigated steel without introducing alloying additions into liquid molten metal pool, in the whole range of used laser power, causes size reduction of dendritic microstructure with the direction of crystallization consistent with the direction of heat carrying away from the zone of impact of laser beam. In the effect of laser alloying with powder of the WC, VC, TiC, SiC, Si_3N_4 and Al_2O_3 particles size reduction of microstructure as well as dispersion hardening through fused in but partially dissolved particles and consolidation through enrichment of surface layer in alloying additions coming from dissolving elements occurs. Introduced particles of carbides, oxides, nitrides and in part remain undissolved, creating conglomerates being a result of fusion of undissolved powder grains into molten metal base. In effect of convection movements of material in the liquid state, conglomerates of carbides arrange themselves in the characteristics of swirl. Remelting of the steel without introducing into liquid molten pool the alloying additions in the form of carbides, oxides, nitrides powders, causes slight increase of properties of surface layer of investigated steel in comparison to its analogical properties obtained through conventional heat treatment, depending on the laser beam power implemented for remelting. Laser surface modification has the important cognitive significance and gives grounds to the practical employment of these technologies for forming the surfaces of new tools and regeneration of the used ones.