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Profile of SHM Ltd. (P. Holubář) 191

Experience in European projects (P. Holubář) 192
The article describes experience and results of international projects of EU, where SHM played a significant role.

Europe leads in high-tech machining coatings
(MM Industrial spectrum) 194
At the end of 2009 European Commission carried out an evaluation of success of growth projects realized under the 5th framework program, which ended between 2004 and 2008. Out of 726 audited projects 7 successful ones representing different industrial branches were chosen. Among them was a project NACODRY, which in the Czech Republic represents SHM as a dominant industrial partner.

Optimization of nc-(Ti_xAl_{1-x})N/a-Si₃N₄ nanocomposites hardness deposited by low voltage arc using technology of rotary cylindrical cathodes (M. Jílek, M. Šíma, O. Zindulka) 195
Industrial application of nanocomposites dates back to 1996, however despite the effort put in since then, their potential is far from being exploited. Next to already published influence of deposition temperature and partial pressure of nitrogen, other key variables were suggested by Prof. Vepřek, who clarified their importance/influence in terms of hardness and stability of mainly TiSiN composites. Based on his papers and recommendations, we studied an influence of optimal content of silicon and oxygen on hardness of nc-(Ti_xAl_{1-x})N/ a-Si₃N₄ coating, which was deposited from rotary cylindrical cathodes using low voltage arc.

Prof. Dr. Dr. h.c. Stan Vepřek 205

Methodology of cutting tests to assess the impact of protective coating on cutting tools
(P. Zeman, O. Zindulka, J. Skrbek) 205
Assessment of newly developed coatings merely by the means of laboratory methods, which define the main properties of the coating such as hardness, composition or friction parameters, is nowadays far from being sufficient. The gained information is often irrelevant with the real performance of the coatings during the machining. Since it is necessary to secure systematicness and repeatability of the results also the "field test" directly at customers can be excluded. Inevitable complement to both mentioned methods is thus laboratory testing of the coating impact on the cutting process. The main goal of the cooperation of SHM and VCSVTT was to set up a functional methodology for efficient testing of protective coatings on milling tools.

Economic aspects of cutting operation (P. Zeman) 209
Besides its occupation with basic research the VCSVTT is also engaged in cooperation with industrial companies. Cutting operation team in VCSVTT occupies itself the most often with problems in connection with recommendation of cutting technologies and processes, choice or testing of cutting tools, measurement of the workpiece quality, analysis of energy intensity of cutting process or choice of optimal cutting conditions with the aim to minimize production costs or maximize production productivity. The most recent cooperation of VCSVTT and SHM focused on questions about the possibility of reducing production costs at cutting.

Influence of PVD process parameters on TiAlN coating structure (M. Jílek ml., P. Vogl) 212
It is advantageous to have a tool for a coating stoichiometry calculation to control coating deposition made from two different cathodes. Stoichiometry depends not only on arc currents ratio, but also on intensity and shape of magnetic field. This relation has been experimentally verified and is presented for TiAlN coating prepared by a new coating device Pi111. With the aid of this tool, it is possible to estimate coating parameters and to reach the desired Al/Ti ratio in a coating.

With increasing content of Al in a coating, cubic structure shifts to hexagonal structure. This change proves itself not only by hardness decrease, but also by a change of coating growth rate. For detailed description of this effect, method of calculation of coating stoichiometry described above was used.

Mechanical treatment of the tools before PVD coating
(M. Šíma) 215
Edge preparation becomes of the most important parameter which significantly influenced final practical application of tools. This article summarizes commonly used and also relatively new ways of preparation of the tools surface before and after PVD coating application. These methods are explained with respect to their advantages and limits of their application.

Basic structure and subsystems of a radar
(J. Pospíšil, F. Pluháček) 218

Twenty years of the Czech and Slovak Society for Photonics
(M. Jedlička) 224
The article compiles personal memories of the Czech and Slovak Society for Photonics's promoter dealing with its foundation and brief agency summary during first twenty years, and its relation to international organisations.

From technical library (I. Brezina) 227

ANOTACE

Současný rozvoj v chápání a využití supertvrdých nanokompozitů nc-TmN/a-Si₃N₄
(S. Vepřek, M. G. J. Vepřek-Heijman) 199
Stručně shrnujeme současný rozvoj v přípravě, vlastnostech a původu zvýšené tvrdosti a průmyslovém využití supertvrdých nanokompozitů nc-TmN/a-Si₃N₄, které jsou složeny z nanokrytalů tvrdého tranzitního nitridu kovu o velikosti 3-4 nm spojeného s pevnou vrstvou nitridu křemíku. Takový unikátní materiál dosahuje tvrdosti nad 40 GPa. Jsou vytvářeny pomocí plazmatického chemického nebo fyzikálně vakuového nanášení v podobě tenkých vrstev a jsou využívány jako strojní nástroje pro soustružení, vrtání, frézování, tvarování a ražení. Nanokompozity v porovnání s konvenčním povlakováním zvyšují produktivitu řady strojních obrábění.