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DEVELOPMENT AND APPLICATION OF NEW MULTICOMPONENT ELECTRODE MATERIALS FOR DEPOSITION TECHNOLOGIES

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The synthesis of advanced multicomponent nanostructured films by PVD and pulsed electrospark deposition (PED) requires the development of multicomponent electrodes. Self-propagating high-temperature synthesis (SHS) is a promising method for electrodes fabrication, which provides a highly dense, exhibits required mechanical, thermal, and electrical properties needed for such composite materials. The control of chemical composition of targets facilitates the deposition of multicomponent films with required composition. In the case of multicomponent target uniform flow of both metal and non metal atoms and ions is realized from the target to substrate. SHS- targets can be especially benefit for the deposition of multifunctional nanostructured films in which both metallic (Ti, Ta, Al, Mo, Cr, Ca) and nonmetallic (Si, B, C, P, O, N) elements.

The second part of the work is focused on the development of electrodes for PED. Four groups of electrodes are presented: *dispersive-hardening ceramic materials* with effect of simultaneous strengthening of carbide grains and metallic binder by precipitations; *nanoparticles disperse-strengthened composite materials* with nanoparticles based on refractory compounds; *MAX- phases based materials*; *nanostructured cemented carbides*. Coatings deposited on Ti-, Ni-, Fe- alloy substrates with successful combination of hardness, elastic recovery, adhesion strength, heat resistance, and reduced friction coefficient were obtained.

Keywords

composite
electrode
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structure
properties