Analytical Review of the Reports Presented at the 14th International Conference on Films and Coatings (ICFC14)

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Abstract. In this preface main trends in the development of films and coatings technology presented at the 14th International Conference on Films and Coatings (ICFC14) that was held on 14–16 May 2019 in Saint Petersburg, Russia are discussed.

During the Conference were presented the results of theoretical and experimental research in the physics and mechanics of condensed matter, physics of low temperature plasma, formation of films and coatings using plasma and related methods that were obtained over the past two years that have passed since the previous meeting.

Special attention was paid to the study of properties of surfaces and coatings, methods of their research, new coating materials, including nanomaterials, new areas of their application, development of modern equipment and technological processes, surface preparation and many other issues.

During the Conference were presented more than 150 reports that were distributed in 7 sections:
- vacuum ion-plasma methods;
- thermal spray coating methods;
- equipment for deposition of films and coatings;
- materials for sputtering and deposition;
- nanomaterials and nanotechnologies;
- properties of coatings and films and methods of their evaluation;
- preparation of surfaces before deposition and methods of post-processing of coatings and films.

For the second time the Conference had a special section for young scientists, where presentations were made by students, postgraduates, candidates and doctors of science aged up to 32 years. Among the authors of the reports were representatives of Russia, Germany, USA, Czech Republic, Poland, Belarus, Ukraine, China, Vietnam, Myanmar, Kazakhstan, Finland, Romania, Portugal, Korea and Lithuania.

The conference was opened by Professor Viktor Luchinin, vice rector for scientific work of the Saint Petersburg Electrotechnical University (figure 1).

In their reports the authors reflected the issues of thin films growth, their compositions and structures, including nanostructures. Were presented original researches in the field of thermodynamics and kinetics of phase transitions of the first kind in multicomponent systems. Particular attention was paid to the kinetic theory of initial stages of brittle destruction of solids, to the
mechanical properties of films and coatings. In a number of reports were presented the issues of optimization of the growth processes of thin films during vacuum ion-plasma and gas-thermal spraying using computer methods. Further development has acquired the theoretical and experimental researches in the field of physics and mechanics of formation of hollow powders for thermal spray methods of coatings deposition.

![Figure 1. Some photos from the Conference.](image)

In a number of reports were reflected the characteristics of magnetron sputtering systems and principles of coatings deposition on their basis. The characteristics, technological aspects of production and results of testing of gradient coatings for aerospace optics were discussed. At this Conference many reports were devoted to the formation of oxide coatings by different methods and for different fields of application. In the series of reports were presented the results of studies on the effect of layout schemes of technological installation on the structure parameters and mechanical properties of wear-resistant coatings.

Many of the results and designs of the authors were at the world level. Many developments are protected by patents for inventions. The design and main parameters of vacuum ion-plasma systems for applying functional coatings were presented. Examples of the application of superhard nanostructured coatings on materials and products were shown. Prospects for the use of the developed equipment in the industry were discussed. Also during the Conference were discussed issues of preparation of young specialists and scientific personnel.

Thus, the 14th International Conference on Films and Coatings contributed to the further development of this scientific and applied direction of research and professional development of the participating scientists.