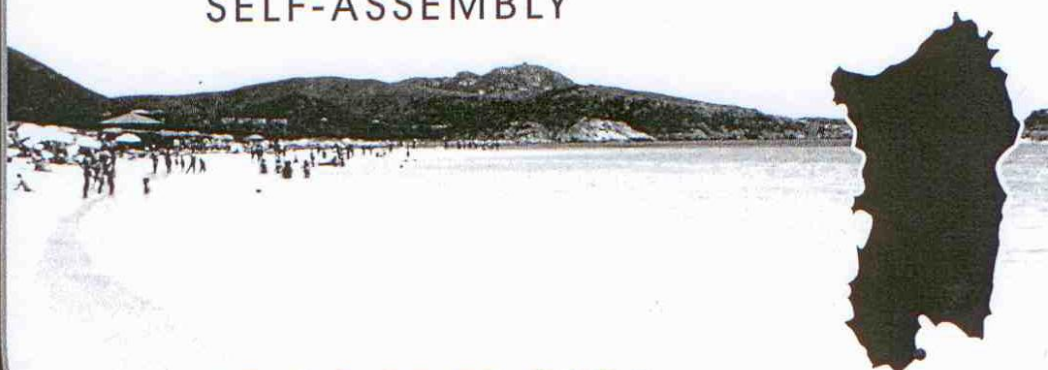


NANOSEA

2012

**INTERNATIONAL CONFERENCE
ON NANO-STRUCTURES
SELF-ASSEMBLY**



25-29 JUNE 2012

S. Margherita di Pula (Sardinia, Italy)

nanosea.roma2.infn.it

PROGRAM AND BOOK OF
ABSTRACTS

CHAIRPERSONS

I. Berbezier, Im2np - CNRS, Aix-Marseille University, Marseille, France

M. De Crescenzi, University of Rome Tor Vergata, Rome, Italy

Research on physical-mechanical properties of nanostructured ion-plasma wear-resistant coatings

*M.Urbach*², *A.Urbach*¹, *K.Savkovs*³, *K.Carjova*³

¹ Dr.hab.sc.ing² Dr.sc.ing., ³ M.sc.ing.
Riga Technical University, LV-1658, Riga, Latvia

The research considers different testing methods and facilities used by the author for the evaluation of physical-mechanical properties of materials and parts with wear-resistant coatings. The paper includes technological characteristics of creating coatings using the methods of ion-plasma sputtering and ion implantation. It analyses the results received during experimental research of microstructure and chemical composition of the obtained coatings by using a scanning electron microscope with micro analyzer.

It substantiates the modes of testing and proposes criteria for the evaluation of coating wear resistance. It is suggested to carry out abrasiveness tests by using cylindrical rotating specimens made of the material being tested and sample plated specimens. The abrasiveness of a coated plunger is defined from average linear wear of specimens during a certain friction path. It is suggested to carry out the evaluation of wear resistance of restored parts from the results of comparative fast test which defines relations between the wear rates of the restored surface and the sample surface tested in the same conditions.

Tribological tests have been conducted using an automated tribometer according to "ball and disc" scheme (rotational motion module) and "ball and plate" scheme (reciprocal movement module). The method and microhardness measurement instrumentation considered in this paper made it possible to evaluate the quality of basic material and coatings. On the basis of the obtained diagrams of coating plasto-elastic deformation, it is suggested to evaluate the strength of different types of coatings (see Fig.1).

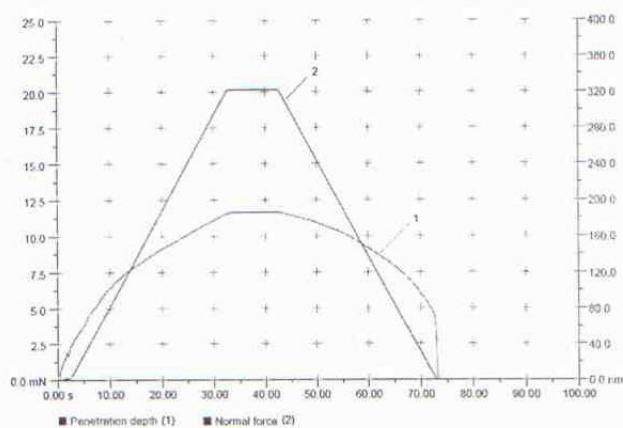


Fig. 1. The results of nano-indentation of the coating:
1 – time curve of indentation depth h ; 2 – time curve of normal force P