

INTRODUCTION

This Proceedings Volume of the Seminar *Surface Engineering with High Energy Beams - Science and Technology* is an outstanding contribution to the dynamic field of surface modification. The papers in this volume document well the use and applications of high energy laser, electron and ion beams, and demonstrate the great versatility of these techniques in generating new engineered surfaces for important manufacturing materials.

The very high heating and cooling rates made possible by high energy beam heating produce very fine surface microstructures with enhanced properties. Either heating to accomplish highly localized solid state phase transformations or to accomplish melting and subsequent rapid solidification are possible with high energy beams. Completely new or metastable phases in addition to highly refined microstructures may be produced. Laser heating because of its versatility and ability to be used without special vacuum systems appears to be the dominant high energy source, but the other methods also have their current and potential applications.

The Seminar on *Surface Engineering with High Energy Beams - Science and Technology* is the second International Seminar sponsored by the International Federation for Heat Treatment and Surface Engineering. The seminars are directed to timely, specialized topics in heat treatment and surface engineering. The first IFHT International Seminar, Plasma Heat Treatment, Science and Technology, was held September 21 to 23, 1987, in Senlis, France. That seminar was successful and a similarly important proceedings volume was published with that seminar. The specialized seminars are held between the IFHT International Congresses on Heat Treatment of Materials. These congresses cover a much broader range of topics in heat treatment and surface modification, and are held approximately every two years. The last congress was in Chicago, Illinois, USA in October 1988, and the next congress will be in Moscow, USSR, in December 1990.

We thank the speakers and authors who participated in Surface Engineering with High Energy Beams, and especially thank the organizing committee, Olinda Conde (Faculdade de Ciências de Lisboa), Luis Guerra-Rosa (Instituto Superior Técnico, Lisboa), António P. Loureiro (Instituto Superior Técnico, Lisboa), James P. Naylor (CETIM, Senlis, France), and Rui Vilar (Instituto Superior Técnico, Lisboa) for the excellent seminar they have organized.

George Krauss

President

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"CEMUL-Centro de Mecânica e Materiais da Universidade Técnica de Lisboa" and "SMP - Sociedade Portuguesa de Materiais", the portuguese members of IFHT, had the honour of welcoming to Portugal all the participants in this 2nd International Seminar on the subject of Surface Engineering with High Energy Beams. This is an important field in which Portugal is now becoming actively engaged.

CEMUL, the organizer of this 2nd Seminar, is indebted to Dr. J. P. Naylor, Vice-President of IFHT, for his participation in the Organizing Committee, contributing with his experience from the 1st Seminar held in Senlis, France.

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