

**2nd International Conference on Innovative Materials
in Extreme Conditions**



**PROGRAM
and
BOOK OF ABSTRACTS**

20-22 March 2024

Belgrade, Serbia

Program and Book of Abstracts of the 2nd International Conference on Innovative Materials in Extreme Conditions (IMEC2024) publishes abstracts from the field of material science, physics, chemistry, earth, and computational science on the phenomena arising during the processing and/or exploitation of the innovative materials, which are presented at the international conference on innovative materials in extreme conditions.

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Publisher

Vinča Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade

Serbian Society for Innovative Materials in Extreme Conditions (SIM-EXTREME)

Printing layout

Dr. Ivana Cvijović-Alagić

Press

Donat Graf d.o.o., Vučka Milićevića 29, 11306 Grocka, Belgrade, Serbia

ISBN 978-86-7306-171-9

CIP - Каталогizacija u publikaciji
Народна библиотека Србије, Београд

66.017/.018(048)

INTERNATIONAL CONFERENCE ON INNOVATIVE MATERIALS IN EXTREME
CONDITIONS

(2 ; 2024 ; BEOGRAD)

Program ; and the Book of abstracts / 2nd International Conference on Innovative Materials in Extreme Conditions [i. e.] [(IMEC2024)], 20-22 March 2024 Belgrade, Serbia ; [organizers Serbian Society for Innovative Materials in Extreme Conditions (SIM-EXTREME) [and] University of Belgrade, Vinča Institute of Nuclear Sciences - National Institute of the Republic of Serbia, Center of Excellence "Center for Synthesis, Processing and Characterization of Materials for Application in Extreme Conditions" (CEXTREME LAB) [and] University of Belgrade, Faculty of Mechanical Engineering] ; [editors-in-chief Branko Matović ... [et al.]]. - Belgrade : University, Vinča Institute of Nuclear Sciences, National Institute of the Republic of Serbia : Serbian Society for Innovative Materials in Extreme Conditions [i. e.] (SIM-EXTREME), 2024 (Belgrade : Donat Graf). - 82 str. : ilustr. ; 30 cm

Tiraž 70. - Str. 3: Preface / editors. - Bibliografija uz pojedine apstrakte. - Registar.

ISBN 978-86-7306-171-9 (VINS)

а) Наука о материјалима -- Апстракти б)
Технички материјали -- Апстракти

COBISS.SR-ID 139413001

Erosion wear of HCCI alloys

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Failures in industrial plants, which operate under extreme conditions, could occur after a short time of exploitation. Erosion wear of materials is caused by the relative movement of solid particles and the surfaces of components. Such erosive wear can lead to the failure of industrial components in a very short time and/or a sharp decline in the structural integrity of industrial equipment. For example, the wear of the ash disposal system in a coal-burning thermal power plant, due to impact of ash particles with a high content of mineral residues, is a very common case of failure and outages in the operation of such industrial systems.

Two high chromium cast irons (HCCI) were tested to determine the erosion wear. These alloys contain 15% Cr and 25% Cr, and it was tested in as-cast and after heat treatment (annealing). A specially designed installation was used for the gas blast sand erosion test. Type of erodent was foundry quartz sand. Erosion tests were done with high erodent particle velocity (90 m/s) and high erodent feed rate (3000 g/min). This conditions represents those similar to extreme wear conditions of some components of thermal power plants using pulverized high mineral content coals.

Microstructural characterization was done at samples before and after erosion tests, Fig. 1. The main results indicate that matrix plastic deformation and distribution of carbide phase have a significant contribution to erosion resistance of HCCI alloys in such conditions.

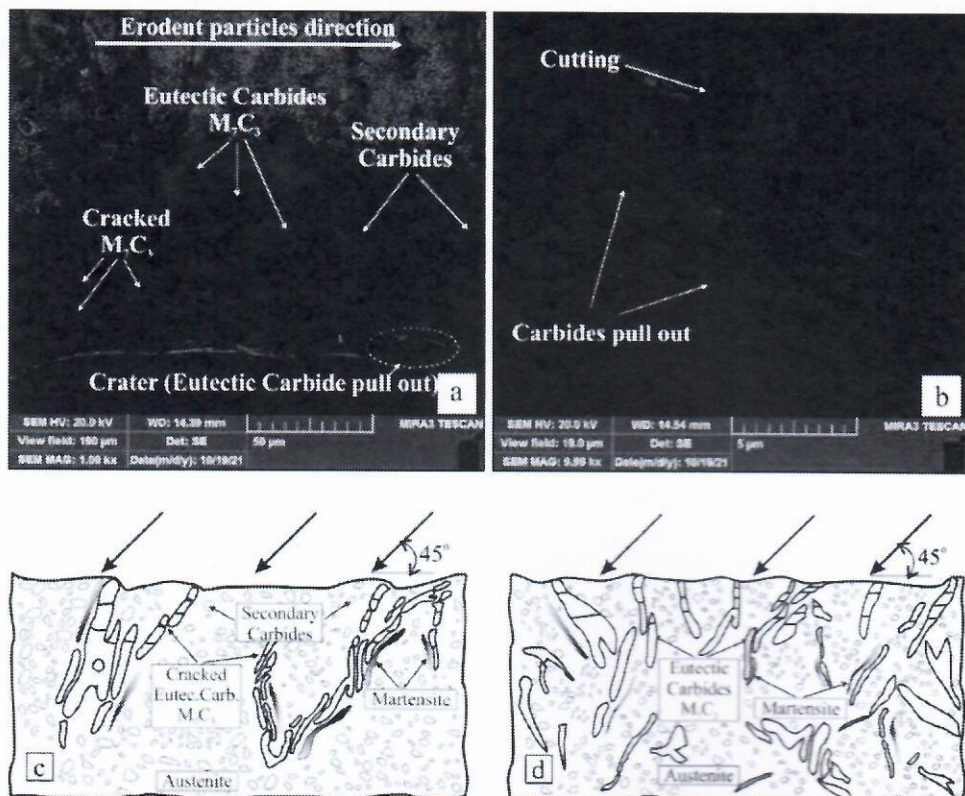


Figure 1. Eroded surface morphology with schematic display of erosion mechanism (a, c) HCCI-15-HT and (b, d) HCCI-25-HT