ICMTM2019 CONFERENCE SCHEDULE

2019 7th International Conference on Metallurgy Technology and Materials (ICMTM2019)

Xiamen, China

June 14-15, 2019

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Simple Version of the Schedule

Program detail Friday, June 14, 2019		
Conference Schedule		
Conference Venue		**Xiamen SeaShine Palace Hotel 夏商•怡翔酒店（南湖店）**
Date & Time		Friday, June 14, 2019 14:00-17:00
Friday, June 14, 2019	14:00-17:00	Sign in

Program detail Saturday, June 15, 2019		
Conference Schedule		
9:00-13:40	**Keynote Session & Plenary Session**	
	9:00-9:40	**Plenary speech: Prof. Katsuyuki Kida** ***Topic:*** *Magnetic health monitoring system for structural steel elements*
	9:40-10:20	**Keynote speech 1: Prof. Kung-Chung Hsu** ***Topic:*** *Preparation of Novel Hydrogels and Applications in Concrete*
	10:20-10:40	**Tea Break & Photo**
	10:40-11:20	**Keynote speech 2: Prof. Jesus Toribio** ***Topic:*** *THydrogen-Assisted Cracking Paths in Cold-Drawn Pearlitic Steels: Resembling Dead Christ Perspective*
	11:20-12:00	**Keynote speech 3: Prof. Takahiro OHASHI** ***Topic:*** *Development of Multi-Point Die Support System for Large Deep Drawings*
12:00-13:00	**Lunch Break**	
13:00-13:40	**Keynote speech 4: Dr. Yanfei Cao** ***Topic:*** *Homogenized steel by low-oxygen purifying idea: its mechanism and practice*	
13:40-17:00	**Session**	

Note:

1. All the participants are strongly advised to arrive before 8:50, June 15, 2019.

2. Certificate of Participation can be collected at the registration counter at Xiamen SeaShine Palace Hotel 1st floor lobby.

3. Please copy PPT files of your presentation to the secretary when registration.

4. The organizer doesn't provide accommodation, and we suggest you make an early reservation.

5. If you want to deliver oral presentation but your paper is not in the session list, please contact us by Email: cfp@icmtm.org

Instruction about Oral Presentation

Devices Provided by the Conference Organizer:

Laptops

Projectors & Screen

Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF files

Duration of each Presentation-Regular Oral Session: about 8 -10 Minutes of Presentation and 5 Minutes of Q&A

Committees

Conference Secretary

Grace Yu, SHANGHAI X ACADEMY Co.， LTD

Program Committee

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Prof. Guan Renguo, Northwestern Polytechnical University, China

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Prof. Dr. N.ETHIRAJ, Dr. MGR Educational and Research Institute -University, India

Dr. GAURI SANKAR MUKHERJEE, Defence Research & Development Organization, India

Dr. Antonio Riveiro Rodríguez, University of Vigo Applied Physics Department School of Industrial Engineering, Spain

Associate Professor, Yi Zhu, School of mechanical engineering in Zhejiang University, China.

Venue

Xiamen SeaShine Palace Hotel（夏商·怡翔酒店-南湖店）

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Plenary speech

June 15, 2019 (9:00-9:40)

Prof. Katsuyuki Kida

University of Toyama, Japan

Speech Title: Magnetic health monitoring system for structural steel elements

Professor Katsuyuki Kida was born in 1968 in Osaka, where he studied mechanical engineering at Osaka University from 1988. Apart from course work, he studied rolling contact fatigue (RCF) occurring in TiC and TiN coated steels using both X-ray diffraction and scanning acoustic microscopy. After graduation he pursued his academic career and obtained a Ph.D. in engineering mechanics in 2000, investigating RCF problems of all-Si3N4 bearings. By observing cracking and flaking failure under RCF, he succeeded in explaining the material`s features from the viewpoint of fracture mechanics. From 2000 he focused his work on investigating the contact problems of several materials used in machine elements. He has also continued fundamental research on contact problems, for which he received 'The Best Paper Prize (FFEMS PRIZE)' from 'Fatigue & Fracture of Engineering Materials & Structures' journal in 2005. The awarded papers reported establishing a crack growth mechanism under contact pressure, a problem previously unsolved for over 70 years since S. Way's proposed theory. His research interests now include the development of three dimensional scanning Hall-probe microscope technologies, fatigue phenomena in polymer bearing, crack growth mechanism under contact stresses and refinement of high-carbon steels. He holds and has held a number of prestigious leadership roles in academy-industry corroboration programs: refinement of steels, new joint system in humanoid robots and fatigue of polymer bearings in "Strategic Fundamental Technologies Strengthening Assistance Programs" (Ministry of Economics, Trade and Industry, Japan, 2009-2013); scanning Hall-probe microscopy in "Fundamental Studies on Technologies for Steel Materials with Enhanced Strength and Functions" (Consortium of the JRCM, Japan, 2008-2012); and ceramic bearing elements in the project supported by "Japanese Energy and Industrial Technology Development Organization" (NEDO, Japan, 2007-2011)." As a chairperson of department of mechanical engineering in University of Toyama, Professor Kida is heading education and research projects (2019-).

Keynote speech 1

June 15, 2019(9:40-10:20)

Prof. Kung-Chung Hsu

National Taiwan Normal University, Taiwan

Speech Title: Preparation of Novel Hydrogels and Applications in Concrete

Dr. Kung-Chung Hsu received Ph.D. in Department of Chemical Engineering at The Penn State University, in 1985. He worked as a senior scientist in the R & D Department of China Steel Corp. in 1985-1990. He was an Associated Professor in 1990-1996, and has been a professor in the Department of Chemistry of National Taiwan Normal University, Taipei, Taiwan, since 1996. Dr. Hsu has research interests in (1) preparation and application of dispersing agents in ceramic materials, (2) preparation and development of superplasticizer and self-curing agents in concrete, and (3) preparation and application of nano powder and graphene/polymer composites. So far he has published more than 40 SCI papers and obtained over 20 patents.

10:20-10:40	Photo & Coffee Break

Keynote speech 2

June 15, 2019 (10:40-11:20)

Prof. Jesus Toribio

University of Salamanca, Spain

Speech Title: Hydrogen-Assisted Cracking Paths in Cold-Drawn Pearlitic Steels: Resembling Mantegna's Dead Christ Perspective

Professor Jesús Toribio graduated in Civil Engineering in 1982 and then in Mathematics in 1986. In 1987 he was awarded his PhD in the Polytechnic University of Madrid (UPM) and turned into Associate Professor in that Institution. In 1992 he became Full Professor and Head of the Materials Science Department of the University of La Coru?a (at the age of 32, thus being the youngest Full Professor in the area of Materials Science in Spain). In 2000 he moved to the University of Salamanca (USAL) where is currently Full Professor of Materials Science and Head of the Fracture and Structural Integrity Research group (FSIRG) of that Institution.

His research work is mainly concerned with fatigue and fracture mechanics, environmentally assisted cracking, stress corrosion cracking and hydrogen embrittlement/degradation/damage of metals and alloys (mainly cold drawn pearlitic steel wires for civil engineering and austenitic stainless steels for nuclear engineering and energy applications), covering theoretical, computational and experimental aspects. He actively participates in International Conferences, very often being member of the International Advisory Committee, organising Special Sessions/Symposia, being Session Chairman or delivering Plenary/Keynote/Invited Lectures. Professor Dr. Jesús Toribio has published more than 500 scientific papers, most of them in international books and journals.

He is the Chairman of the Technical Committee 10 (TC10): Environmentally Assisted Cracking of the European Structural Integrity Society (ESIS) and has been Director (2013-2017) of the International Congress of Fracture-The World Academy of Structural Integrity (ICF-WASI), being responsible of launching the Ibero-American Academy of Structural Integrity (IA2SI). Prof. Toribio has been awarded a variety of scientific research prizes and awards including: (i) UPM Young Scientist Award of the Polytechnic University of Madrid; (ii) METROTEC Award for the best Technological Research Project; (iii) Honour Medal of the Spanish Group of Fracture (GEF/SEIE) in recognition of his research achievements in the field of fracture mechanics; (iv) Fellow of the Wessex Institute of

Technology (WIT) in recognition of leadership and outstanding work in engineering sciences, (v) Top Reviewer 2011 in recognition of an outstanding contribution to the quality of the Elsevier International Journal Engineering Fracture Mechanics, (vi) Fellow of the European Structural Society (ESIS Fellow) for his outstanding contributions to the art, science, teaching or practice of fracture mechanics and his service to the society; (vii) Honorary Member of the Italian Group of Fracture (IGF) in acknowledgement and appreciation of his outstanding achievements in the research field of fracture mechanics (viii) Best Paper and Presentation Award in the International Conference on Energy Materials and Applications (ICEMA 2017) held in 2017 in Hiroshima, Japan, with a paper entitled: Numerical Simulation of Hydrogen Diffusion in the Pressure Vessel Wall of a WWER-440 Reactor.

Keynote speech 3

June 15, 2019 (11:20-12:00)

Prof. Takahiro OHASHI

Kokushikan University

Speech Title: Development of Multi-Point Die Support System for Large Deep Drawings

Professor Takahiro Ohashi is Head of Mechanical Engineering Department of Kokushikan University (December 2012-Present); Representative delegate of Japan Society for Technology of Plasticity (April 2016-Present); The board of trustees of Aluminum Forging Association in Japan; Experience in directing a national research project for a new die structure of Ministry of Economy, Trading and Industry (METI); Experience in directing 3 research teams of National Institute of Advanced Industrial Science and Technology (AIST).

12:00-13:00	Restaurant at seventh floor

Keynote speech4

June 15, 2019 (13:00-13:40)

Dr. Yanfei Cao

Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, China

Speech Title: Homogenized steel by low-oxygen purifying idea: its mechanism and practice

Dr. Yanfei Cao has been focusing on the formation and control of solidification defects such as porosity, segregation and crack in heavy steel ingots. Based on the numerical simulation and experimental characterizations, a novel formation mechanism of channel segregation by inclusion flotation has been proposed; The differences of solidification behaviors among various model alloys and steels have been investigated in depth; Euler-Lagrange multi-phase flow segregation model coupling inclusion flotation has been built for the first time. Until now, he has published more than 10 SCI/EI articles in the renowned journals of Nature communications, Acta Materialia, Metallurgical and Materials Transactions A, Journal of Materials Processing Technology, Computational Materials Science, Materials & Design, and so on. He has made more than 8 oral presentations and 1 plenary report in the famous international conferences of materials and metallurgy. And now, he is the leader/co-leader of more than 11 projects funded by National Natural Science Foundation of China and some important industries in China and France.

Session List

June 15, 2019 (13:40-17:00)

1. Paper ID: 15

Title: Two-stage Agitation Leaching of Old Flotation Tailings

Authors: Aleksandr Bulaev, Vitaliy Melamud, Anna Boduen

Abstract: The goal of the present work was to develop hydrometallurgical approaches based on acid leaching for selective extraction of base metals from the sample of old flotation tailings as well as obtaining solution, which can be used for leaching of substandard copper-zinc concentrate. Old flotation tailings contained 23.2% of iron, 0.36% of copper, and 0.23% of zinc. Copper-zinc concentrate contained 23.8% of iron, 16% of copper, and 5.3% of zinc. Agitation leaching of old flotation tailings with distilled water and sulfuric acid solutions (of 0.5 to 10% H2SO4) for 3 h at pulp density of 20% made it possible to extract of 26 to 34% and of 58 to 70% of copper and zinc, respectively. Concentrations of copper and zinc in the pregnant solutions were of 0.19 to 0.25 g/L and of 0.27 to 0.32 g/L, respectively. The increase in H2SO4 concentration up to 10% did not lead to significant increase in base metals extraction but led to significant increase in iron ions concentration in the pregnant solutions. Pregnant solution obtained during the leaching with water contained less than 1 g/L of iron ions, while that obtained during the leaching with 10% sulfuric acid contained about 9 g/L of iron ions. Therefore, two-stage acid leaching with water and 10% sulfuric acid was proposed for selective extraction of non-ferrous metals in the first stage and obtaining of ferric iron solution in the second stage. Two-stage leaching at pulp density of 40% with water made it possible to extract 31 and 64% of copper and zinc, respectively. It was shown, that second stage did not allow to increase non-ferrous metals extraction but made it possible to obtain solution containing 11g/L of ferric iron. This pregnant solution was used for oxidative leaching of copper-zinc concentrate. Leaching at 80°C made it possible to extract 13 and 48% of copper and zinc, respectively.

2. Paper ID: CT709

Title: Corrosion Resistance of Zn-Al-Mg Alloys with Hypoeutectic Microstructure

Authors: Guangrui Jiang, Ting Shang, Guanghui Liu

Abstract: Zn-Al-Mg alloys with hypoeutectic microstructure were melted through a high frequency induction furnace. The content of aluminum and magnesium in the alloys were between 1% to 2%. Scanning electron microscopy (SEM) was utilized to analyze microstructure and phase, respectively. Effect of alloying element contents on corrosion resistance was studied. Results show that the Zn-Al-Mg alloys are almost covered by primarily solidified Zn rich block phase and fine lamellar binary and ternary eutectic microstructure exist between the Zn rich phase. The corrosion resistance was characterized through electrochemical test which indicates that increasing Al and Mg content in the Zn-Al-Mg alloys decline corrosion current density. For alloys with 1% Al, more magnesium means lower corrosion potential. For alloys with 2% Al, however, more magnesium suggests higher corrosion potential. In Nyquist curves of electrochemical impedance spectroscopy (EIS) test, Warburg impedance portion could be found for all alloys. With increasing alloying elements content in the Zn-Al-Mg alloys, charge transfer resistance in higher frequency remarkably increase, which implies higher corrosion resistance.

3.Paper ID: 5

Title: The influence of pre-plating on the LME phenomenon of advanced high strength steel

Authors: Xue Bai, Guangrui Jiang, Yun Han

Abstract: The galvanized steel plate is developed to protect the car from air-pollution. However, in the spot-welding process, since the melting temperature of the zinc coating is about 440-460°C, the melted Zn or Zn intermetallic compounds would get penetrated into the grain boundaries, leading to the liquid metal embrittlement (LME). The pre-plating technology has been used to improve the LME resistance property of the galvanized steel. The hot tensile tests and high-temperature three-point bending test has been employed to evaluate the crack propagation path. The results of electron probe micro-analyzer (EPMA) show that Zn penetrates along grain boundaries. The microstructure analysis shows that the pre-plating technology could reduce the quantity of LME microcracks.

4.Paper ID:17

Title: Synthesis and Characterization of The Structure, Microstructure of 1% Fe-doped ZnO Powder Nanostructures as Transparent Ceramic for Optical Applications

Authors: S. Oudjertli

Abstract: ZnO powder nanoparticles mechanically alloyed were doped with iron to investigate their structural and microstructural properties using X-ray diffraction (XRD) and differential scanning calorimetry (DSC) for examined 1% Fe doped ZnO. The ZnO starting pure powder exhibited a hexagonal crystal structure with space group p63mc of ZnO, however with the introduction of 1% Fe in the ZnO milled powder, the hexagonal ZnO phase remained unchanged, whereas the microstructural parameters were subject to significant variations due to the introduction of Fe atoms into the ZnO hexagonal matrix to replace oxygen ones. The size of crystallites and microstrains are found milling time dependent. For the applications of Zinc oxide, Zinc oxide (ZnO) is a potential candidate material for optics applications which has attracted considerable attention over past decades due to its wide potential applications such as ZnO photonic crystal slab, photo catalyst, UV absorption, light emitting diodes, photo detectors, solar cells, gas sensors and so on.

5.Paper ID: CT726

Title: COMPLEX SATURATION OF TITANIUM ALLOYS WITH BORON, CHROMIUM AND TITANIUM

Authors: Guryev Alexey, Guriev Michail Alekseevich, Ivanov Sergei Gennadievich, Zhen Quan, Mei Shunqi

Abstract: This work described the technology of boronizing of titanium Grade2 from the generation of the gas phase directly in a sealed container during the decomposition reactions of the powder saturating medium. With such an implementation of the process in a closed volume, waste gas neutralization devices are not required, since the generation and decomposition of active saturating gases occurs in a closed volume. At saturation of titanium from the gas mixture, titanium borides, titanium nitrides, as well as titanium and chromium carbides recorded in the coating. The microhardness of the coating is 2800–3200 HV0.1. The thickness of the diffusion coatings in this case reaches 75 microns.

6. Paper ID: CT727

Title: WEAR RESISTANCE OF STEELS AFTER DIFFUSION SATURATION OF BORON, CHROME AND TITANIUM

Authors: Guryev Alexey, Guriev Michail Alekseevich, Ivanov Sergey Gennadievich, Zhang Yanwei, Mei Shunqi

Abstract: In this work, the wear resistance of hardened simultaneous diffusion saturation on S235J0, C45, 55NiCrMoV6, C80W1 and X162CrMoV12 steels with boron, chromium and titanium with their wear on rigidly fixed abrasive Al_2O_3 particles investigated. Wear was determined by measuring the loss of mass every 30 seconds of the test. Full wear of the layer occurred in 10 minutes with a load on the sample of 9.5 MPa. According to the test results, it found that the wear resistance of alloyed steels increases as the content of alloying elements and carbon increases, but this increase is not unambiguous because of a decrease in the thickness of the diffusion layer as the degree amplification of alloying steels. Given the economic parameters, such as the cost of steel, the cost of manufacturing products, we can conclude that the greatest economic effect shape when using for hardening steels with a carbon content of 0.5 mass. percent and the total content of alloying elements up to 5 - 7 mass. percent.

7. Paper ID: CT732

Title: Effect of compression conditions on Ti-5Al-5Mo-5V-1Fe-1Cr titanium alloy during isothermal compression

Authors: Sun Shuyu

Abstract: The deformation characteristics of Ti-5Al-5Mo-5V-1Fe-1Cr alloy during isothermal compression are investigated in this work. The alloy ingot is prepared by vacuum consumable furnace first. Then, thermomechanical processing and heat treatment are carried out. The microstructure shows the characteristics of Widmanstatten structure after heat treatment. The heat-treated material is subjected to isothermal compression test. According to the comparison of the coarsening degree of α grain under different experimental parameters. It is revealed that the strain rate has the largest influence on the stress field of the alloy during isothermal deformation.

8. Paper ID: CT733

Title: Observation of subsurface crack of carburized steel (SCM415) under single-ball rolling contact fatigue over 107 cycles

Authors: Masato Fukuda, Koshiro Mizobe, Katsuyuki Kida

Abstract: Bearing fails due to the flaking failure which is caused by the subsurface cracks. The observation of the subsurface cracks is not easy beacause the cracks propagate inside the material. In order to observe the whole subsurface cracks, we performed rolling contact fatigue (RCF) tests of carburized SCM415 at over 107 cycles with the single-ball RCF machine. After the RCF tests, we directly observed the subsurface cracks.

9.Paper ID: CT734

Title: Characterization of Crack Growth Behavior of Carbonized SCM415 steel under Cyclic Rotating Bending

Authors: Takahiro MATSUEDA, Kei USHIZIMA, Koshiro MIZOBE, Katsuyuki KIDA

Abstract: Carbonized steel was used in severe and cyclic loading conditions such as bearing and structural components. In this study rotating bending fatigue tests were carried out to observe the crack initiation and propagation behavior of carbonized JIS SCM415 steel bar whose diameter was 10.0 mm. Transition area origin (TRO) crack on fracture surfaces were observed with scanning electron microscope. Stress amplitude was modified with depth of crack origin, and S-N curve was corrected with modified applied stress amplitude σM. In order to reveal the crack propagation behavior around the border between hardened and soft core area, stress intensity factor (SIF) on crack front was also computed. The depth of fracture origins was about 0.9 mm. TRO crack was observed around the fracture origin which was nucleated at the edge of carbonized layer, and the crack propagated evenly toward the surface and the inside core.

10. Paper ID: CT724

Title: Synthesis of Z-scheme type Ag2O/Ag/Graphene oxide composites as a catalyst for carbon dioxide photocatalytic reaction

Authors: Jia-Xin Chen, Jih-Mirn Jehng

Abstract: The large amount of CO_2 emissions from the increasing consumption of fossil fuels is a critical issue for global warming. Photocatalytic reduction of CO_2 to solar fuels is an ideal approach to simultaneously solve the global warming and alternative energy issues. This study used a simple and easy method to prepare a highly dispersed Ag_2O/Ag

nanoparticles (NPs) on graphene oxide (GO). The Ag_2O/Ag NPs were easily attached to the GO support by anchoring them to the functional groups. Oxygen functionalities on the GO provide nucleation centers for metal ions and can stabilize metal NPs on the support surface. The physical properties and structural information of the Ag_2O/Ag/GO catalysts were further characterized by X-ray diffraction (XRD), Transmitted Electron Microscopy (TEM), Fourier Transform Infrared Spectrometer (FTIR) and Thermogravimetric (TGA) techniques. The TEM and XRD have revealed that the Ag_2O/Ag/GO photocatalyst is well-dispersed with the particle size within the range of 4-10 nm. The photocatalytic activities of all samples were evaluated based on the conversion of CO_2 to methanol under UV radiations of 254 nm. The maximum methanol formation rate was reached at 0.86 mole $(g\text{-}cat)^{-1}(hr)^{-1}$ for the 5 wt % Ag_2O/Ag/GO composite catalyst.

Note: If you would like to deliver oral presentation but your paper is not in the session list, please contact us by Email: cfp@icmtm.org. Thanks again for all your great attention and kind support to ICMTM2019.

Thank you for all of your contributions!