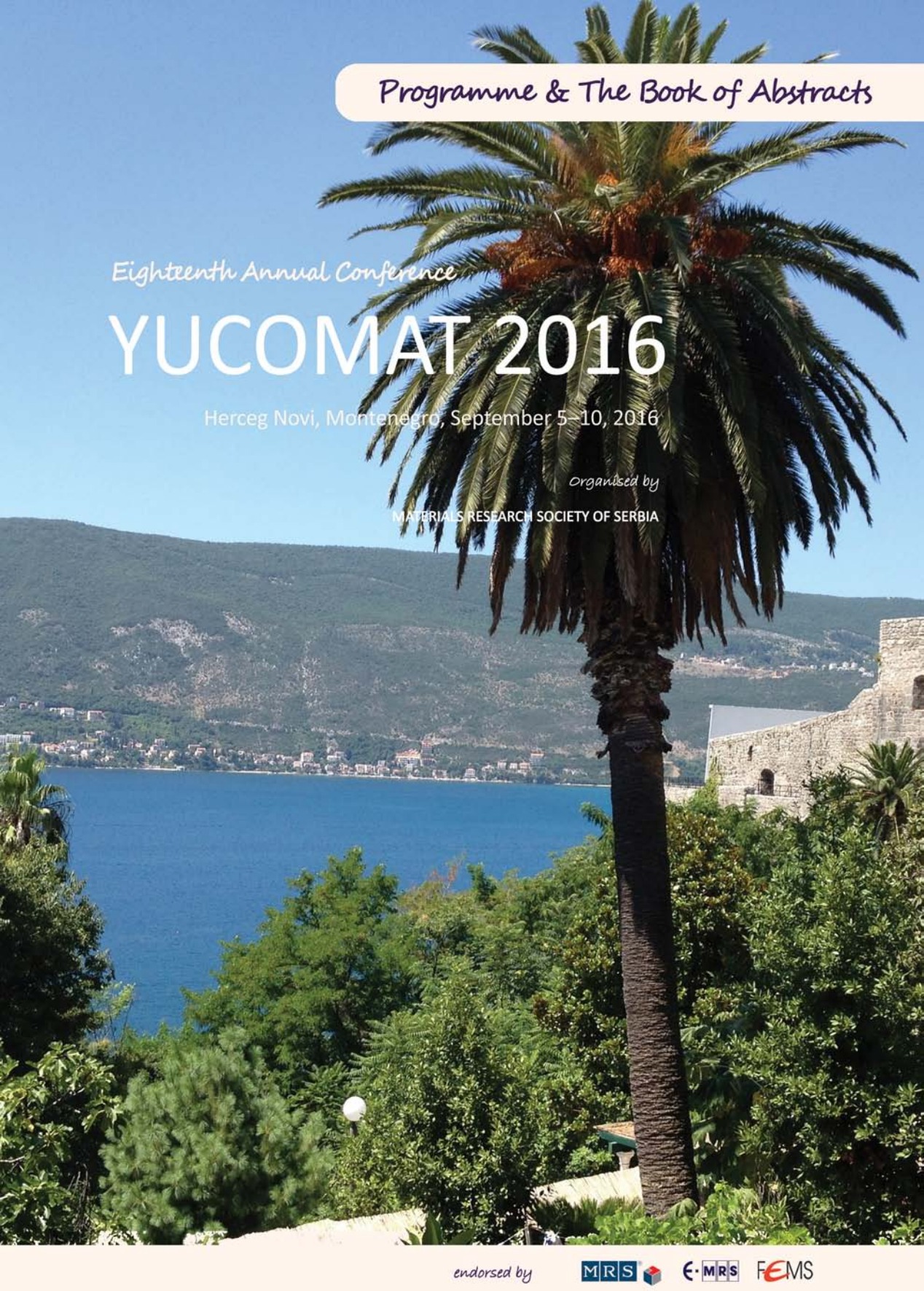

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Eighteenth Annual Conference

YUCOMAT 2016

Herceg Novi, Montenegro, September 5–10, 2016

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TABLE OF CONTENTS

P.S.C.8.

Sputter-deposited Fe/Al thin superlattices: scanning of non-magnetic layer thickness

Ali Karpuz[1], Hakan Kockar[2], Salih Colmekci[2], Mehmet Uckun[2]
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Fe/Al thin multilayer films were produced by sputtering technique. The effect of different thicknesses of non-magnetic (Al) layers on the magnetic properties of the thin multilayer films was investigated. The thickness of Fe layers was 5 nm and total film thickness was 200 nm whereas the thickness of Al layers was adjusted as 95 nm, 35 nm and 7.5 nm considering different bilayer numbers. Atomic Al contents of the multilayers were 71 %, 40 % and 20 % for Al layer of 95 nm, 35 nm and 7.5 nm, respectively. The rest of the films were Fe atoms. A mixture of body centered cubic (bcc) of Fe and face centered cubic of Al structure turned to a bcc structure of Fe when the thickness of Al layers and hence the Al content decreased. Saturation magnetization increased with decreasing Al content and coercivity values altered irregularly.

P.S.C.9.

Effect of IF-WS_2 nanoparticles addition on physical-mechanical and rheological properties and on chemical resistance of water-based paints

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Transition-metal dichalogenides (MoS_2, WS_2, NbS_2, etc.), due to their excellent mechanical properties, are used for a wide range of applications, including aerospace and automotive technology, load bearing and release mechanisms, as solid lubricants, corrosion protection etc. In the form of inorganic fullerene-like particles, with unique morphology, spherical and closed structure, they possess a chemical inertness and a high elasticity. Due to these exceptional characteristics, inorganic fullerene-like particles, such as tungsten disulfide IF-WS_2, are recognized as promising materials and promising fillers of the composites and are extensively studied for their ability to control wetting, adhesion, lubrication on surfaces and interfaces, and to achieve good corrosion resistance. In this paper, a possibility is examined to improve properties of water-based paints by adding nanoparticles of IF-WS_2. Since they have low % VOC (volatile organic compound), water-based paints are eco-friendly substitute for common polymeric coatings, and nowadays it is very important to introduce their usage as much as possible. IF-WS2 were dispersed in paint by ultrasonic irradiation. Physical-mechanical properties and chemical resistance were examined. The following properties were compared for paint without and with IF-WS_2 nanoparticles: hardness, flexibility, elasticity, adhesion, abrasion resistance, IR reflection. Also, resistance to salt atmosphere and salt water were compared. The effect of adding IF-WS_2 on rheological properties of the paints has been examined using Dynamic Mechanical Analysis (DMA), observing viscosity as the function of the shear rate.

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