BOOK OF ABSTRACTS

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NN21

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2021

WS2 Polymers 1

11:00-13:00 V (NN-Timber 1)	WS2 Polymers
11:30-12:00 INVITED V	**Micro-/Nano-surfaces texturing answering the challenges of Circular Economy: developing mono-material 3D plastic parts with functional surfaces** **S. Lebigre,** L. Tenchine, B. Marcilly IPC (Centre Technique Industriel de la Plasturgie et des Composites), FRANCE
12:00-12:15 V	**The effect of CNT's on the crosslinking process and properties of peroxide vulcanized EPDM** **P. Ketikis[1],** I. Ketikis[1], P. Klonos[2], A. Kyritsis[2], P.A. Tarantili[1] [1]School of Chemical Engineering, [2]School of Applied Mathematical and Physical Sciences, National Technical Univ. of Athens, Greece
12:15-12:30 V	**Cellulosic materials in adhesive systems for wood-based panels** **E. Karagiannidis,** E. Athanassiadou, D. Moutousidis, E. Psochia, A. Margellou, K. Triantafyllidis CHIMAR HELLAS S.A., Thermi, Greece Dept. of Chemistry, Aristotle U. of Thessaloniki, , Greece
12:30-12:45 V	**Self-healing coatings for corrosion inhibition** **I. C. Vladu[1],** E. Ahmed[1,2], A. Seitner[2], R. Ebenbauer[2], J. M. Chin[2] [1] CEST, Centre of Electrochemical Surface Technology, Austria [2] U. of Vienna, Faculty of Chemistry, In. of Physical Chemistry, Austria
12:45-13:00 V	**Innovative eco-sustainable photocontrolable and reversibly photoswitchable fluorescent bio-inks** J. Oliveira1, V. Bouça1, A. Barros1, D. Ramada1, A.I. Freitas2, L. Domingues2, T.Q. Aguiar2 1 CeNTI - Portugal 2 CEB - Centre of Biological Engineering, U. of Minho, Portugal

Innovative eco-sustainable photocontrolable and reversibly photoswitchable fluorescent bio-inks

J. Oliveira[1], V. Bouça[1], A. Barros[1], D. Ramada[1], A.I. Freitas[2], L. Domingues[2], T.Q. Aguiar[2]

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Colour-changing materials with controllable properties are highly desirable for technical, smart innovative products. Current developments commonly incorporate photo/thermochromic inks based on molecules obtained by non-sustainable petroleum-based sources that do not allow controlled light-driven switching between colors. To overcome these limitations, our project explores the development of new eco-sustainable bio-inks that take advantage of unique and photo-tunable properties of selected reversibly switchable fluorescent biomolecules (RSFMs), and their application to relevant substrates using conventional and advanced coating methodologies. Besides the appeal of the wide range of promising applications, these biomolecules have the added advantage of being produced by low-cost, eco-sustainable biotechnological methods. The resulting bio-inks were produced by the nanoencapsulation of RSFMs in biocompatible matrices, such as silica, which improves their long-term stability and functionalization potential. RSFMs biologically fused to tags that improve their binding to silica or cotton fibres were also used. In the scope of this work, non-covalent and covalent entrapment strategies were optimized, and their corresponding yields were compared. The fluorescent characteristics of the produced inks were evaluated by spectrofluorimetry and their photoswitching performance was accessed with an equipment developed in-house for such purpose. Their application potential was further investigated by the functionalization of cotton-based textiles via methodologies conventionally used in textile fabrication, with promising results. The project EcoBioInks4SmartTextiles (PTDC/CTM-TEX/30298/2017 and POCI-01-0145-FEDER-030298) is co-financed by the European Regional Development Fund through COMPETE 2020, under Portugal 2020, and by national funds through FCT.