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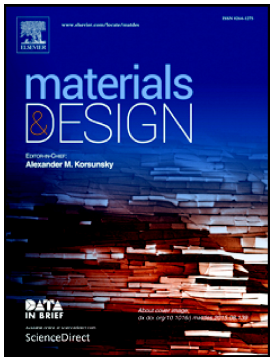

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Bruno V.M. Rodrigues, Claudia A. Razzino, Francilio de Carvalho Oliveira, Fernanda R. Marciano, Anderson O. Lobo

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On the design and properties of scaffolds based on vertically aligned carbon nanotubes transferred onto electrospun poly (lactic acid) fibers

Bruno V. M. Rodrigues [a, b‡], Claudia A. Razzino [a‡]; Francilio de Carvalho Oliveira [a]; Fernanda R. Marciano [a, b, c]; Anderson O. Lobo [a, b, c, d]*

[a] *Laboratory of Biomedical Nanotechnology, Institute of Research and Development (IP&D), University of Vale do Paraiba (UNIVAP), Sao Jose dos Campos, Sao Paulo, Brazil.*

[b] *Laboratory of Biomedical Nanotechnology, Universidade Brasil, Rua Carolina Fonseca 235, 08230-030, Sao Paulo, Brazil*

[c] *Biomaterials Innovation Research Center, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Cambridge, MA 02139, USA*

[d] *Department of Chemical Engineering, Northeastern University, Boston, MA 02115, USA*

Corresponding Author: *Prof. Dr. Anderson de Oliveira Lobo. E-mail: aolobo@pq.cnpq.br and aolobo@mit.edu (Phone: + 551239471100)

‡ These authors contributed equally to this work

Abstract - Herein, we propose the design of a nanoscaffold based on the hot-press transfer of vertically aligned multi-walled carbon nanotubes (VAMWCNT) onto matrices of electrospun poly (lactic acid) (PLA) fibers. To this end, we created a three-dimensional, bioactive and electrically conductive scaffold that combines the potential of PLA as a biomaterial with the physical-chemical and biological properties of VAMWCNT (PLA/VAMWCNT). Given the well-known hydrophobicity of carbon nanotubes, oxygen-plasma functionalization was applied to the scaffolds in order to attach oxygen-containing groups to their surfaces, with the plasma treatment also responsible for the exfoliation of the VAMWCNT's tips. After plasma-functionalization, electrochemical measurements showed that our scaffold presented an increased electroactive area (1.5-fold) with a k^o value of 6.87×10^{-3} cm s^{-1}, confirming its applicability as an electrode. Furthermore, we have also demonstrated the feasibility of electrodepositing nanohydroxyapatite (nHAp) crystals onto this nanoarchitectured material, improving its biomimetic and bioactive features. Preliminary biological