Accepted Manuscript

Preparation and characterization of dual-functional coatings of nanofibrillated cellulose and modified SrAl2O4: Eu, Dy phosphors

Longfei Zhang, Shaoyi Lyu, Zhilin Chen, Siqun Wang

PII: S0257-8972(18)30556-5
DOI: doi:10.1016/j.surfcoat.2018.05.071
Reference: SCT 23446

To appear in: *Surface & Coatings Technology*

Received date: 20 February 2018
Revised date: 23 May 2018
Accepted date: 30 May 2018

Please cite this article as: Longfei Zhang, Shaoyi Lyu, Zhilin Chen, Siqun Wang , Preparation and characterization of dual-functional coatings of nanofibrillated cellulose and modified SrAl2O4: Eu, Dy phosphors. Sct (2017), doi:10.1016/j.surfcoat.2018.05.071

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Preparation and characterization of dual-functional coatings of nanofibrillated cellulose and modified $SrAl_2O_4$: Eu, Dy phosphors

Longfei Zhang [a, b], Shaoyi Lyu [a, b], Zhilin Chen [a, *], Siqun Wang [b, a, *]

[a] *Research Institute of Wood Industry, Chinese Academy of Forestry, Beijing, 100091, China*

[b] *Center for Renewable Carbon, University of Tennessee, Knoxville, TN 37996, USA*

**Corresponding author. E-mail:* chenzhilin@caf.ac.cn (Z. Chen), swang@utk.edu (S. Wang)

Abstract: To prepare luminescent and superhydrophobic dual-functional coating materials, $SrAl_2O_4$:Eu^{2+}, Dy^{3+} (SAOED) phosphors were modified with tetraethyl orthosilicate and (3-aminopropyl)trimethoxysilane for enhancing the water resistance and surface activity. Dual-functional coatings were fabricated by blending nanocellulose, 1,2,3,4- butanetetracarboxylic acid (BTCA), and modified SAOED phosphors on the poly(vinyl alcohol) pretreated surfaces of wood substrates using a two-step process combining spraying and chemical vapor deposition. The surface morphology, chemical structure, and mechanical properties of the hybrid coatings were characterized by SEM, energy dispersive X-ray analysis, FTIR, X-ray photoelectron spectroscopy, and abrasion tests. Incorporation of the modified SAOED particles and ONFC induced surface roughness on the wood surface with simultaneous afterglow luminescence and superhydrophobicity after low-energy modification. The water contact angle of the coating could go up to 153° and the slide angle was only 8.5°. The emission spectra for hybrid films showed a slight blue shift (2.8 nm) at around 512 nm compared to the SAOED particles. The obtained superhydrophobic wood materials with long afterglow luminescence can find application in interior decoration, intelligent ceilings, night indicators, or luminous logos and labels.

Download English Version:

https://daneshyari.com/en/article/8023448

Download Persian Version:

https://daneshyari.com/article/8023448

Daneshyari.com