OVIDIUS UNIVERSITY of CONSTANTA
Faculty of Applied Sciences and Engineering

Romanian Chemistry Society, Constanta Branch

INTERNATIONAL CONFERENCE "CHIMIA"

BOOK OF ABSTRACTS

Volume 2, 2016

26 – 28 May 2016
Constanta, Romania

OVIDIUS UNIVERSITY PRESS, CONSTANȚA 2016
ISSN 2360-3941

OA4. PREPARATION OF HYBRID COATINGS WITH CONTROLLED WETTABILITY: PROCESS PARAMETER STUDY

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The aim of this paper is to investigate the effect of the variables that influence the wetting angle and the coating morphology on promising hybrid films with structured roughness for water repellent applications. Magnetic-chitosan *g*-styrene composite particles (Mag-CS*g*-ST), chitosan and pre-hydrolysed alkoxysilanes were used in various formulations to yield thin films. Magnetite (Fe_3O_4) nanoparticles obtained by co-precipitation [1] were embedded in matrices synthesized by radical graft co-polymerization of styrene (ST) with ethylene glycol di-methacrylate (EGDMA) onto previously modified chitosan bearing surface vinyl groups. Hybrid thin films containing composite particles, chitosan as a polymeric binder and pre-hydrolysed hexadecyltrimethoxysilane (HDTS) or/and tetraethyl orthosilicate (TEOS) [2] as a coupling/crosslinking agent were deposited by spraying. The films were cured by heating and subsequently characterized regarding their morphology (scanning electron microscopy), contact angle with water and adhesion to substrate (scratch test). The effects of the following process parameters upon coating morphology and wetting angle were studied: the coupling agent composition and hydrolysis extent, the solvent used to prepare the particle dispersion and the thermal regime for drying the base layer of the coating. The process was optimized to yield coatings with high wetting angle and good adherence to the substrate in a reproducible manner.

Acknowledgement. This work was supported by a grant of the Romanian Ministry of National Education, CNCS-UEFISCDI, project number PN-II-ID-PCE-2012-4-0433.

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