

Accepted Manuscript

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PII: S0257-8972(16)31092-1
DOI: doi: [10.1016/j.surfcoat.2016.10.095](https://doi.org/10.1016/j.surfcoat.2016.10.095)
Reference: SCT 21740

To appear in: *Surface & Coatings Technology*

Received date: 2 June 2016
Revised date: 26 October 2016
Accepted date: 31 October 2016



Please cite this article as: J. Profili, O. Levasseur, A. Koronai, L. Stafford, N. Gherardi, Deposition of nanocomposite coating on wood using atmospheric pressure cold discharge, *Surface & Coatings Technology* (2016), doi: [10.1016/j.surfcoat.2016.10.095](https://doi.org/10.1016/j.surfcoat.2016.10.095)

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Deposition of nanocomposite coating on wood using atmospheric pressure cold discharge

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This work examines the synthesis of nanocomposite thin films on wood (sugar maple, *Acer Saccharum*, Marsh) surfaces via a one-step process in an atmospheric pressure dielectric barrier discharge (DBD). More specifically, ZnO-SiO₂ nanocomposite coatings are obtained from the atomization in the DBD reactor operated in N₂/N₂O (Townsend discharge) of a stable colloidal suspension. This suspension is made of crystalline ZnO nanoparticles (NPs) dispersed in hexamethyldisiloxane (HMDSO) and pentane (Pe). Scanning electron microscopy (SEM) combined with energy dispersive X-ray spectroscopy (EDS) show ZnO agglomerates well embedded into a dense SiO₂ matrix. The chemical composition and the thickness of the matrix is analyzed through Fourier transform infrared spectroscopy (FT-IR) coupled to ellipsometry measurements. SEM further reveals a lumpy morphology; a feature ascribed to the intrinsic roughness of the wood samples.

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