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Aerosol assisted atmospheric pressure plasma deposition of drug containing composite coatings

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Bio-composite coatings can be defined as interlayers made of at least two components: an organic/inorganic synthetic matrix, well adherent to substrates and working as supporting network, and biological compounds (such as proteins, nucleic acids, lipids, and even cells, virus or their fractions) embedded, conjugated or mixed to the matrix. They are normally employed to improve the biological activity (antibacterial, cell-adhesive, biomolecule-sensing, etc.) of the material they are deposited on, without altering its bulk properties. Recently, an atmospheric pressure plasma deposition process of bioactive molecules (biomolecules, drugs and alike) embedded coatings has been optimized for application in the field of drug delivery. In particular, it consists in coupling an aerosol generator, fed with the bioactive molecule, to a Dielectric Barrier Discharge with the addition of a monomer, suitable for the formation of the matrix of the composite material. In this contribution recent advances in this field will be reviewed with particular emphasis to the preparation of antimicrobial composite coatings. It will be shown that a good control of the plasma process parameters can lead to tune antimicrobial agent content and release, making such approach appealing for future applications.

Keywords

atmospheric pressure plasma

aerosol

biocomposite