Sample abstract and paper Recent results on the development of advanced functional polymers by plasma-assisted vacuum deposition

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The Remote Plasma Assisted Vacuum Deposition (RPAVD) process is a versatile methodology for the fabrication of functional nanocomposites from non-chemically polymerizable organic or organometallic functional molecules. This approach combines the physicochemical reactions involved in plasma polymerization processes with the vapor deposition of functional molecules of interest for the target application requirements. The obtained cross-linked polymer films are insoluble and thermally stable. These films can incorporate a controllable concentration of virtually any kind of thermally stable functional molecule. The method is scalable at wafer level and fully compatible with the use of solvent-sensitive and delicate substrates. The process has been initially applied for the development of optical thin films and photonic devices including optical filters, photonic sensing chips, and lasing media (1-3). However, the properties of the films can be tailored to other functional applications like the development of controlled wetting and ice retarding surfaces, antimicrobial surfaces, and high-performance dielectric ultrathin films. In this communication we will also show very recent results on the use of the technique for the protection of nanostructures on surfaces, on the encapsulation and modification of perovskite solar cells and the application of dielectric films in 2D strain engineering (4-7).

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