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Plasma-based synthesis of multifunctional thin dielectrics: probing the interaction of silver nanoparticles with DsRed proteins

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Current strategies for development of new biomaterials take into consideration the fundamental “protein adsorption problem” and the associated protein structure/function relationship because of the exposure of proteins to non-biological solid surfaces. Plasma-based processes successfully apply to the synthesis of biomaterials. However, their rational engineering requires knowledge on the plasma behavior in order to design the structural, optical, electrical and bio-related properties of the deposits. In this work we exploit the multifunctionality of silver nanoparticles (AgNPs) as plasmonic antenna when embedded in thin SiO₂ layers (called plasmonic substrates) and as biocide agents because of their strong toxicity towards micro-organisms [1]. We propose an appropriate strategy to study the ‘protein-adsorption problem’ and to probe the interaction of AgNPs with proteins through coupling of AgNPs and *Discosoma* red fluorescent proteins (DsRed) that display exceptional photo-stability [2-4].

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