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Plasma-inspired biomaterials (plenary)

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Plasma as a discharge state of the gas is considered nowadays a cutting edge tool which can manipulate objects at the atomic or molecular scale. On the other hand, the biomaterials are substances that are engineered to possess certain properties which can control the interactions with components of living systems, inducing favourable response from the biological entities, and as such can direct the course of a therapy or diagnostic procedure. In this respect, plasmas can be used to initiate even more favourable or selective responses, making the biomaterials even more suitable for their interaction with biological entities.

The most appropriate plasmas for initiation of these responses and modifications are so-called cold plasmas, which are generated from reduced to atmospheric pressures. Cold plasmas are employed to tailor the surfaces of materials for decades. With the increasing relevance of biomaterials, which can augment or replace partially or totally any tissue, organ or function of the body, in order to maintain or improve the quality of life of the individuals, the potential of plasmas in the field is extraordinary and has seen some significant advances in last years.

This talk will highlight the most recent developments in the area where plasmas are used directly or indirectly for preparation of biomaterials or biocompatible surfaces. It will cover all general aspects of research which connects plasma and biomaterials, ranging from plasma preparation of biomaterials for different applications (hard tissues such as bone, and soft tissues) including drug delivery applications, antibacterial coatings, and biological interactions of the plasma-prepared surfaces with bacteria, cells and tissues. Novel developments for diagnostics and sensing will be included as well. All of these topical areas were represented in a special issue on "Plasma-inspired biomaterials" published in J. Phys. D: Appl. Phys, 2017.

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