Effects of radiation, ion and electron beams emitted from the dense plasma focus on Tin and its alloys

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The dense plasma focus devices have been extensively used as a source of multi-radiation such as neutron yield [1], soft [2] and hard [3] X-rays, ion beams [4, 5], and high-energy relativistic electrons [6, 7]. The low energy (2.8 kJ) Mather-type plasma focus device (AECS PF) is used for material processing as a porous structure [8], bismuth nanospheres, formations on silicon substrates [9] as well as for X-ray radiography [10, 11]. The ion [12] and electron [13] beam features emitted from plasma focus have been computed using Lee model and the energy loss for energetic ions due to interactions with the background gas and target is also calculated using SRIM code [14].

In this work, we are planning to evaporate the Tin targets (pure and alloys) by the plasma focus to simulate the TOKAMAK wall, under various experimental conditions (number of shots, gas pressure, distance from the top of the anode). The sputtered Tin particles (atoms and ions) will be deposited on secondary target (stainless steel substrate or silicon for example). The analysis of this target will give information about the elemental composition of deposited material on the surface of this target. Optical emission spectroscopy measurements of the formed Sn vapour due to interactions of plasma focus (electrons and ions) with the treated targets could be investigated and discussed.

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