

ABSTRACT

TOROIDAL FILAMENT FOR PLASMA GENERATION

A filament (18) for an ion implanter ion source or plasma shower is provided comprising first and second legs (20a, 20b) and a thermally emissive central portion (40) having ends connected, respectively, to the first and second legs. Preferably, the legs (20a, 20b) are constructed from tantalum (Ta), and the thermally emissive portion (40) is constructed of tungsten (W). The thermally emissive portion is coiled substantially along the entire length thereof and formed in the shape of a generally closed loop, such as a toroid. The toroid is comprised of two toroid halves (40a, 40b) coiled in opposite directions. The toroid halves are constructed of a plurality of filament strands (42, 44, 46) twisted together along substantially the entire length thereof. The coils of the toroid are capable of establishing closed loop magnetic field lines (B) therein when electrical current flows through the thermally emissive portion. The closed loop magnetic field lines (B) confine electrons (E) emitted from the surface of the thermally emissive portion within the confines of the coils.

Figure 5