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**DEVELOPMENT OF TUNGSTEN BRUSH STRUCTURES  
FOR PFC ARMOR APPLICATIONS**

K.T. Slattery,<sup>1</sup> B.C. Odegard Jr,<sup>2</sup> T.N. McKechnie,<sup>3</sup> R.D. Watson<sup>4</sup>

1 The Boeing Company, St. Louis, MO 63166-0516

2 Sandia National Laboratories, Livermore, CA 94550

3 Plasma Processes Incorporated, Huntsville, AL 35811

4 Sandia National Laboratories, Albuquerque, NM 87185-1129

Thermo-mechanical modeling has indicated the desirability of using brush structures (clusters of small filaments or rods) for armor in plasma facing components as a means of reducing stresses at the joint with the heat sink. Fabrication challenges have prevented use of this armor configuration to date. Development work in the US has resulted in methods for fabricating tungsten (W) brush structures suitable for scale-up on the ITER targets and dome. Methods developed use 1.6mm and 3.2mm diameter W welding electrode as stock for the armor, and welded metallic honeycomb for fixturing. Three approaches to fabricating said structures are: (1) Cu or Cu/W functionally gradient materials (FGMs) are plasma sprayed to the W brushes followed by diffusion bonding to the Cu alloy heat sink, (2) Cu is cast to the tips of the W brushes followed by diffusion bonding to the Cu alloy heat sink, and (3) W rods are coated with a bonding aid and are directly pressed into and diffusion bonded to the Cu alloy heat sink. All three methods utilize low temperature Cu/Cu diffusion bonding techniques also developed in the US under ITER. The honeycomb core may be left in place to, provide indications of armor wear.