

Contribution submission to the conference SKM 2023

CVD Diamond Disks for ITER ECH windows - dielectric loss characterization and optical inspection — ●SABINE SCHRECK¹, GAETANO AIELLO¹, PABLO ESTEBNEZ², ANDREAS MEIER¹, THEO SCHERER¹, DIRK STRAUSS¹, CHRISTOPH WILD³, and ECKHARD WOERNER³ — ¹Karlsruhe Institute of Technology, Institute for Applied Materials, 76021 Karlsruhe, Germany — ²Fusion for Energy, 08019 Barcelona, Spain — ³Diamond Materials, 79108 Freiburg, Germany

Diamond disks with a diameter of 70 mm and a thickness of 1.11 mm will be installed into windows of the Electron Cyclotron Heating and Current Drive System (EC-HCD) of the fusion reactor ITER. The bare disks, manufactured by a microwave plasma assisted chemical vapor deposition process, need to ensure high mechanical stability, thermal conductivity and transmission of MW-class microwave beams. Factory acceptance tests of the disks produced by Diamond Materials include a check of dimensional properties and a determination of its dielectric loss. The loss characterization and the comparison with the respective specifications is performed at KIT using dedicated Fabry-Perot resonators, that allow the measurement of the loss tangent at the disk centre and a mapping of it over the disk area. An optical inspection with a digital microscope completes the examination. More than 60 diamond disks need to be qualified prior to their integration into the window assemblies and the application in the ITER EC-system. The disk qualification activities are performed within a contract between F4E and KIT and the talk will present the current status.

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