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2.49 Research on the normal spectral band emissivity of tungsten between 150 and 500°C

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Tungsten is an important alternative material to construct the divertor for Tokamak. Due to the effect of the interaction of plasma and the first wall, the first wall, especially the divertor area, will bear high energy to act on the area. Therefore, the detection and diagnosis of the first wall temperature of Tokamak by non-contact temperature measurement is the premise to ensure the safe and stable operation of the whole facility. However, in order to achieve high precision non-contact temperature measurement, we must accurately measure the emissivity of tungsten. In this paper, we built a set of emissivity measurement system and a new method for accurate calculation of emissivity is proposed. This method effectively eliminated the interference of background radiation and improves the accuracy of emissivity measurement. By using this method, the author measured the emissivity of tungsten under the conditions of different surface roughness in the range of 150℃ to 500℃, and discussed the uncertainty of the experiment at the end.

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