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Effects of hydrogen as sheath gas on properties of inductive coupled thermal plasma for B_4C/Cu functionally gradient material preparation QIJIA GUO, PENG ZHAO, LIN LI, GUOHUA NI, XIAODONG ZHANG, Institute of Plasma Physics, Chinese Academy of Sciences, PO Box 1126, Hefei 230031, China, INSTITUTE OF PLASMA PHYSICS, CHINESE ACADEMY OF SCIENCES, PO BOX 1126, HEFEI 230031, CHINA TEAM — B_4C/Cu functionally gradient material (FGM) is a promising candidate for plasma facing material (PFM) in fusion device. Thermal Plasma spraying technology is supposed to be suitable for the B_4C/Cu FGM preparation. In this work, inductively coupled thermal plasma (ICTP) is used to prepare the B_4C/Cu FGM. However, the high gas temperature of pure Ar plasma can damage the torch and it's thermal conductivity is low. The hydrogen has high thermal conductivity, so the mixture gas of Ar and hydrogen is used as sheath gas to protect the ICP torch and enhance the thermal conductivity of the plasma. Optical emission spectroscopy is used to diagnose the properties of ICTP to determine the optimum condition for preparation process. In addition, to control the preparation process, some atomic emission lines and prepared material changed with experiment conditions will be studied. All the plasma properties would give us an insight on the mechanism and the possibility of improving the process.

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