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Spectroscopic diagnostics of dusty plasmas KARIM OUARAS[1], LSPM - CNRS, GREMI - CNRS COLLABORATION[2], INP GREIFSWALD COLLABORATION[3] — The formation of carbon nanoparticles particles in low pressure magnetized hydrocarbon plasmas is investigated using infrared quantum cascade laser absorption spectroscopy (QCLAS), mass spectrometry (MS) and laser extinction spectroscopy (LES). Results showed that dust formation is correlated to the presence of a large amount of large positively charged hydrocarbon ions. Large negative ions or neutral species were not observed. These results, along with a qualitative comparison of diffusion and reaction characteristic, suggest that a positive ion may contribute to the growth of nanoparticles in hydrocarbon magnetized plasmas. Growth of carbon nanoparticles has been widely studied in RF plasma. Our aim is to complete these studies in different discharge system, in which the growth mechanisms may be different. In particular, we focus our work on dipolar ECR microwave discharge. The magnetic field of the plasma source is likely to trap carbon-containing charged particles and then modify the dust growth kinetics. In the present study the combination of these diagnostics gives us the tools to study the kinetics of plasma processes. In this way both qualitative and quantitative characteristics could be obtained. An outstanding role may be attributed to the positive ions in the monitored magnetized plasmas, whereas usually formation of dust is supposed driven by negative ions. In addition, we focus our work in tungsten nanoparticle in particular with LES, this noninvasive technique provide us the tool to follow the dynamics and concentration dust.

[1]K. Ouaras, L. Colina Delacqua, G. Lombardi, K.Hassouni, X.Bonnin
[2]M.Wartel
[3]J. Röpcke

Karim Ouaras
LSPM - CNRS

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