Abstract Submitted
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Dynamics of Ar* metastables atoms in dust free and dusty argon plasmas[1] ILIJA STEFANOVIC, Ruhr-Universitaet, Bochum, Germany, BRANKICA SIKIMIC, Ruhr-Universitaet, Bochum, Germany, NADER SADEGHI, Univ. Grenoble-CNRS, France, JOERG WINTER, Ruhr-Universitaet, Bochum, Germany, EXP. PHYS. II TEAM, UNIV. GRENOBLE-CNRS TEAM — Generation of nano-sized hydrocarbon particles through RF plasma polymerization of Ar diluted C_2H_2 could be suppressed or enhanced by proper plasma-pulsing, depending upon the pulsing frequency. Thus, the processes in afterglow play important role for dust generation. We applied Laser Absorption Spectroscopy to trace the time evolution of metastable density in different gas mixtures: pure Ar, Ar/ C_2H_2, Ar/C_2H_2/dust and Ar/dust. By introducing C_2H_2 in argon plasma, a very fast decay of metastables in the afterglow was detected, caused by a strong quenching rate in Ar* - C_2H_2 collisions. From the decay time we deduced that about 98% of C_2H_2 was dissociated in the plasma. After formation of the dust particles, the metastable density enhanced and reached the ten time larger density in argon/dust mixture, for the same pressure and input power. The reason is the formation of dusts, which give the additional source of particle losses. These losses are compensated by increasing the electron temperature, thus the ionization rate.

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