

Abstract Submitted  
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**Impacts of plasma fluctuation on growth of nanoparticles in low pressure reactive VHF discharge plasmas**<sup>1</sup> MASAHARU SHIRATANI, KUNIHIRO KAMATAKI, YASUO MORITA, HYUNWOONG SEO, NAHO ITAGAKI, GIICHIRO UCHIDA, KAZUNORI KOGA, Kyushu University — Here we discuss impacts of plasma fluctuation on nanostructure formation using plasmas. We studied the effects of plasma fluctuation on the growth of nanoparticles in capacitively-coupled VHF discharges with amplitude modulation (AM) using 2 dimensional laser light scattering method [1]. AM gives an artificial plasma fluctuation. Nanoparticles grow more slowly for higher AM levels, which causes the density of nanoparticles to increase by 100%, their size to decrease by 23%, and narrower size dispersion. The increase in the nucleation density of nanoparticles by AM causes a decrease in the radical flux to a nanoparticle. Eventually we obtained a diagram of the three particle growth modes of positive feedback, negative feedback, and independent ones. We also have developed a simple theory of particle growth in reactive plasmas. The theory predicts experimental results well. Our approach can be applied to realize precise control of a wide variety of nanostructure formations.

[1] K. Kamataki, et al., J. Inst. 7 (2012) C04017.

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