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Nano-particle manipulation using pulse RF discharges with amplitude modulation SHINYA IWASHITA, HIROSHI MIYATA, HIDEFUMI MATSUZAKI, KAZUNORI KOGA, MASAHARU SHIRATANI, Kyushu University
— We have proposed a novel nano-system construction method, which consists of production of nano-blocks and radicals (adhesives) in reactive plasmas, their transport towards a substrate, arrangement of nano-blocks on the substrate [1-3]. For the method, size of nano-blocks is controlled by the duration of pulse RF discharges [1] and their rapid transport towards a substrate is realized using pulse RF discharges with amplitude modulation (AM) of the discharge voltage [2, 3]. During the period of AM nano-blocks can be transported from their generation region near the powered electrode to a substrate at a velocity more than 67 cm/s, which is at least 6 times that after turning off the unmodulated discharges. Such rapid transport needs an asymmetric potential profile, in other words, a large voltage drop across the sheath near the powered electrode. We will report the experimental results and discuss the mechanism of the rapid transport in this presentation. [1] S. Nunomura, et al. J. Appl. Phys., 99, 083302 (2006). [2] K. Koga, et al. J. Phys. D, 40, 2267 (2007). [3] M. Shiratani, et al. Faraday Discuss., 138, 127 (2008).

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