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Introducing designed local strain to graphene using dielectric nanostructures H. TOMORI, A. KANDA, H. GOTO, Y. NUKUI, Y. TOYOTA, H. KARUBE, S. NIHEI, University of Tsukuba and CREST-JST, Y. OOTUKA, University of Tsukuba, K. TSUKAGOSHI, MANA-NIMS and CREST-JST, M. HAYASHI, Akita University, H. YOSHIOKA, Nara Women's University — Strain engineering is a promising method for controlling electron transport in graphene. In this presentation, we report a simple and easy method for inducing designed local strain in graphene films [1]. Nanostructures made of a dielectric material (electron beam resist) are placed between graphene and the substrate, and graphene sections between nanostructures are attached to the substrate. The strength and spatial pattern of the strain can be controlled by the size and the separation of nanostructures. Application of strain is confirmed by the Raman spectroscopy as well as from scanning electron microscope (SEM) images. The Raman 2D peak shows spatially nonuniform downshift, which corresponds to the positions of the resist nanostructures. From SEM images, the maximum stretch of the graphene film reaches about 20%. This technique can be applied to formation of band gaps in graphene.

[1] H. Tomori *et al.*, Appl. Phys. Express **4**, 075102 (2011).

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