

Abstract Submitted  
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**Fabrication of a single layer of polystyrene nanoparticle array, and their use as templates for NIR-light responsible metallodielectric plasmonic nanoshells<sup>1</sup>** SHUHEI UCHIDA, KAZUYA YAMAMURA, NOBUYUKI ZETTSU, Research Center for Ultra-Precision Science and Technology, Graduate School of Engineering, Osaka University — We have proposed a facile methodology to fabricate two-dimensionally periodic non-close packed (ncp) arrays of spherical polystyrene nanoparticles with controllable their structural parameters through stepwise integration including the preparation of a single layer of hexagonally close-packed (hcp) spherical PS nanoparticles and atmospheric pressure He plasma-induced isotropic etching. The plasma process converted the hcp arrangement into ncp arrangements with remaining unchanged their original spherical shape and periodicity. The structural parameters of the 2D colloidal crystal could be precisely controlled with nanometric accuracy by the plasma treatment time. We also demonstrated that the isolated PS nanoparticles array can be utilized as a template for making a near infra-red light responsible metallodielectric plasmonic nanoshells array. It was revealed that the strong sharp extinction peak at the NIR region should be assigned to localized surface plasmon resonance in the nanoshells.

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