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A Resonance Tuning of Localized Surface Phonon Polaritons on Hexagonal Boron Nitride YEJIN KWON, MYOUNG-HWAN KIM, Texas Tech University — Metasurfaces are sub-wavelength patterned layer which interact with light and alter optical responses. In particular, gradient optical metasurfaces have been used to control a wavefront of light in free space and in optical waveguides. However, a control of light on two-dimensional surface has been challenging because of the high optical power loss from metallic nanostructures. In recent years, we have chosen polar dielectrics as a metasurfaces platform because the polar dielectrics have a low optical power loss and a high coupling efficiency to the light from ionic crystals. We classified polar dielectrics into two groups (bulks and two-dimensional materials) depending on the evanescent field characters of surface waves of the light on polar dielectrics. In this work, we propose metasurfaces platform made of two-dimensional hexagonal boron nitride. We have searched for a localized surface phonon resonances by designing the device using full wave simulation with the fintie-difference time-domain method. We studied two different geometries; metal/dielectric multilayer boundary (1) underneath the polar dielectrics and (2) on the polar dielectrics.

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