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**Inhomogeneous ozone doping and heat induced defects in graphene studied by infrared near-field microscopy** WENJIE WANG, JIAWEI ZHANG, HAIMING DENG, MEGNKUN LIU, DU XU, Stony Brook University — With the potential use of surface plasmon such as transfer data many orders faster than traditional wires, it has been very popular in research. The fact is that the wavelength of of plasmon is much shorter than the one of free space radiation. The UV ozone doping level can be fine controlled in room temperature creating selected plasmon circuit. We study inhomogeneous graphene plasmonics in ozone doped graphene using scattering-type scanning near-field infrared microscopy and spectroscopy. The single layer and bilayer graphene are doped with different dosage of ozone under UV exposure, which lead to surface inhomogeneity and inhomogeneous graphene plasmon polarition excitation under tip. After annealing the ozone doped graphene in air, the inhomogeneous doping induced plasmons disappear, together with the occurrence of local defects after high temperature annealing.

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