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Imaging the Individual Nitrogen Dopant Atoms in Graphene with Thermoelectric Measurements HO-KI LYEO, SANGHEE CHO, Korea Research Institute of Standards and Science, EUI-SUB LEE, YONG-HYUN KIM, Korea Advanced Institute of Science and Technology, JUNSTIN BULT, JEFFREY BLACKBURN, National Renewable Energy Laboratory — Chemical doping of nitrogen has been known as a means of modifying the electronic structure of graphene grown on a Cu substrate. We used scanning thermoelectric microscope to investigate the influence of individual nitrogen dopant atoms on the local electronic structure in monolayer graphene. Nitrogen-doped graphene was grown on a single crystal Cu substrate by using the chemical vapor deposition of pyridine molecules that contain a nitrogen atom substituting a carbon atom in the carbon hexagon. Thermoelectric voltage measurements, which we have shown to be differentially sensitive to the Fermi energy state, can produce two-dimensional images of electronic signature near the individual nitrogen dopants on the atomic scale. The measurements yielded a more complicated and extended modification of electronic structure than previously measured by using tunneling spectroscopy, which can be accounted for by the theoretical simulation and experimental evidences of nitrogen inclusion obtained from Raman and XPS measurements.

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